# Solid Waste Management Plan

- Montgomery Regional Solid Waste Authority
- Town of Blacksburg, Virginia
- Town of Christiansburg, Virginia
- Montgomery County, Virginia
- Virginia Polytechnic Institute and State University



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#### **EXECUTIVE SUMMARY**

This Plan is required by the Regulation for Solid Waste Planning of the Department of Environmental Quality. The Solid Waste Management Plan should include the following:

- An integrated waste management strategy
- A discussion as to how the plan will be implemented
- Objectives for solid waste management within the jurisdiction
- Definition of incremental stages of progress toward objectives and a schedule for their implementation
- Descriptions of the necessary funding and resources, including consideration of fees dedicated to the development of future facilities
- A strategy for the provision of the necessary funds and resources
- A strategy for public education and information on source reduction, reuse, and recycling
- Consideration of public and private sector partnerships and private sector participation in execution of this plan.

## Purpose of the Plan:

- 1. To ensure continued compliance with the Regulations.
- 2. Long term plan for managing Region's Solid Waste.

#### Continued Compliance with State of Virginia Solid Waste Planning Regulations:

In the <u>Regulations for Solid Waste Management Planning</u>, <u>Amendment 1</u>, there are two primary requirements with which planning regions must comply:

## • Consideration and Addressing of State Solid Waste Hierarchy

The State regulations require each planning region to develop a comprehensive and integrated solid waste management plan that, at a minimum, considers and addresses all components of the following hierarchy of solid waste management methods:

- Source reduction
- o Reuse
- Recycling

Resource Recovery (waste-to-energy)
<ul> <li>Incineration</li> </ul>
o Landfilling
• Achievement of State Recycling Goal - It is the policy of the State that each plannin region achieves a minimum recycling rate of 25% of the total municipal solid waste generated annually within the region. The local solid waste management plan must describe how his goal will be achieved and maintained through the implementation of local recycling programs and systems.
The Region, most have facilities available to manage the various waste streams produced
To address these items, a Steering committee was created consisting of representatives
from:
Town of Blacksburg
Town of Christiansburg
VPI&SU
Montgomery County
The Montgomery Regional Solid Waste Authority and
Olver Incorporated
The plan includes:
1. A description of the Region
2. Population and population projections
<ol> <li>Description of the Solid Waste Streams and quantities to include per capita generation rates and waste stream projections for each locality.</li> </ol>
4. Description of the existing Solid Waste Management System of each locality to include collection, recycling, waste reduction, special waste management, and, in the case of the Authority:
Transfer
Disposal
Recycling
Waste Reduction
ii

Education

Partnerships and

Special Waste Management Services

5. Existing systems for Construction and Demolition (C & D) wastes, industrial waste and regulated medical wastes are discussed.

#### **Conclusions:**

- 1. Long term disposal capacity is available
- 2. C&D services are privately provided
- 3. The Recycling Facility has approximately 50% of its capacity remaining
- 4. Flow control is a problem. Approximately 17,000 tons/year of solid waste are being taken to other facilities.

## **Solid Waste Management Goals:**

The Plan has goals for each jurisdiction which support and enhance the goals of the Authority.

The Authority's goals for the next 20 years are in three areas:

- A. Solid Waste Goals
  - 1. Maximize waste stream capture
  - 2. Minimize tipping fees to NRRA; stabilize and/or reduce tipping fees at the transfer station
  - 3. Eliminate hazardous and/or medical waste in incoming loads
  - 4. Develop a long-term solution for tire disposal
  - 5. Conduct a pilot program for the composting of leaves and grass clippings
  - 6. Evaluate the feasibility of sewage sludge composting
  - 7. Develop a web site for the Authority.
- B. Recycling Goals
  - 1. Cover financial responsibilities of the Recycling Processing Facility

- a. Operating expenses
- b. Prorated administrative costs
- c. Depreciation cost on equipment and facility
- 2. Eliminate hazardous and/or medical waste in recyclables
- 3. Increase flow
- 4. Explore new programs such as adding new materials or products for recovery through the RPF to respond to future market conditions
- 5. Improve incoming and outgoing quality of recyclables
- 6. Expand the regional program for the management and recycling of electronic wastes and universal wastes.
- 7. Continue to expand industrial recycling programs

#### C. Education Goals

- 1. Continue to expand curriculum for solid waste/Recycling/Litter Prevention educational materials.
- 2. Continue to explore opportunities available for community outreach
- 3. Expand education outreach for commercial recycling programs and include recognition incentives.
- 4. Construct a Recycling Education Center.

# **Future Alternatives for Solid Waste Management**

Municipal Solid Waste Management – Future Systems and Services					
MSW Projections	FY 2004/05			Y 2023/24	
	Tons Per Year	Tons Per Year Tons per Day		Tons Per Day	
	79,969	308	92,507	356	
Jurisdiction		Existing	Systems		
MRSWA		1 2	MRSWA Transfer Stor the planning period	ation to handle	
Sufficient disposal capacity exists at NRRA year disposal capacity at current filling rate)     MSW tonnages for the planning period					
	Future Systems and Services				
Montgomery	Increase capacity at two collection convenience centers				
County	<ul> <li>Continue to convert and consolidate remaining box sites to collection convenience centers</li> </ul>				
Town of Blacksburg	Continue to utilize MRSWA transfer and disposal services				
Town of Christiansburg	Continue to utilize MRSWA transfer and disposal services				
Virginia Tech	Continue to utilize MRSWA transfer and disposal services				
MRSWA	Explore feasibility of offering a packaged collection/disposal service to commercial customers				

Principal Recyclable Materials – Existing Systems and Future Plans					
Projections	FY 2004/05		FY 2023/24		
	Tons Per Year	Tons Per Day	Tons Per Year	Tons Per Day	
Principal Recyclab	ole Materials				
Manufactured Recyclable Materials	30,948	119	35,800	138	
Yard Waste	9,596	37	11,101	43	
Supplemental Rec	yclable Materials				
	6,625	25	7,663	29	
Jurisdiction	·	Existin	g Systems		
MRSWA	<ul> <li>Sufficient capacity exists at MRSWA RPF to process projected tonnages of manufactured recyclable materials throughout the planning period</li> <li>Sufficient capacity exists at MRSWA yard waste processing facility (under construction) to process projected tonnages of yard waste throughout the planning period</li> <li>Future markets for recycled materials will create new opportunities to support the MSW recycling levels achieved in the region</li> <li>Continue to explore new markets and evaluate the targeting of additional products and materials for recycling and recovery</li> </ul>				
		•	re Plans	J	
Montgomery County	Complete conversion of green box system to consolidated collection sites  Continue to the December 111 - D				
Town of Blacksburg	<ul> <li>Continue to utilize MRSWA Recyclables Processing Facility</li> <li>Enhance Apartment Recycling Ordinance</li> <li>Continue to utilize MRSWA Recyclables Processing Facility</li> <li>Influence and respond to new markets for recyclables</li> <li>Continue and expand recycling education programs</li> <li>Enhance recycling programs that are currently underway</li> </ul>				
Town of Christiansburg	Continue to utilize MRSWA Recyclables Processing Facility				
Virginia Tech	Continue activities to support the development of a regional composting facility by the MRSWA				
MRSWA	<ul> <li>Continue to utilize MRSWA Recyclables Processing Facility</li> <li>Explore feasibility of offering a commercial recyclables collection service</li> <li>Explore feasibility of offering a document destruction/recycling service</li> </ul>				
	• Construc	et Recycling Educati	on Center at RPF		

## **Other Waste Streams**

Other Waste Streams – Existing Systems and Future Plans					
Projections	FY 2004/05		FY 2023/24		
	Tons Per Year	Tons Per Day	Tons Per Year	Tons per Day	
Construction and Demolition Wastes <sup>1</sup>	53,707	207	62,128	239	
Industrial Wastes	9,188	35	10,628	41	
Regulated Medical Wastes	960	4	1,110	4	
Jurisdiction	Existing Systems				
MRSWA	<ul> <li>Sufficient capacity exists at MRSWA Transfer Station to handle projected C&amp;D waste tonnages for the planning period should the need arise</li> <li>Sufficient disposal activity exists at NRRA Regional Landfill (100 year disposal capacity at current filling rate) to dispose of projected C&amp;D tonnages for the planning period should the need arise</li> </ul>				
	Future Plans				
All jurisdictions and institutions	<ul> <li>Continue to rely on existing private processing and disposal service providers to manage waste streams</li> </ul>				
MRSWA	Utilize MRSWA Transfer and Disposal Capacity for C&D Wastes and Industrial Wastes should the need arise				

Based upon National Average figures

# **Special Wastes**

Special Wastes – Existing Systems and Future Plans						
Projections	Projections FY 2004/05			023/24		
	Tons Per Year	Tons Per Day	Tons Per Year	Tons Per Day		
White Goods	1,104	4	1,277	5		
Tires	1,420	5	1,642	6		
Used Oil	221	1	255	1		
Used Batteries	631	2	730	3		
Sludges	1,104	4	1,277	5		
Jurisdiction	Existing Systems					
MRSWA	<ul> <li>The MRSWA RPF currently receives a number of special wastes, including white goods, used oil, sludge and tires</li> </ul>					
	Future Plans					
All jurisdictions and institutions	<ul> <li>Continue to rely on MRSWA RPF and local private retailers to manages these special wastes</li> </ul>					
MRSWA	Explore the feasibility of sludge composting					
	<ul> <li>Explore the feasibility of developing a regional recycling and management program for "universal" wastes, such as fluorescent lamps and e-waste</li> </ul>					

# Implementation

Implementation Schedule and Strategies for Solid Waste Systems and Services Identified For Implementation During the Planning Period					
Jurisdiction	System or Service	Schedule	Funding Requirement	Funding Resources	
Town of Blacksburg	Implementation of Apartment Recycling Mechanism	2004-2009	None	N/A	
Town of Christiansburg	No New Services Planned	N/A	N/A	N/A	
Montgomery County	Expansion of Capacity of Two Consolidated Collection Sites	2004-2006	\$44,000 (\$22,000 per additional compactor)	County General Fund	
Virginia Tech	Support of MRSWA Regional Composting Center	2004-2010	None	N/A	
MRSWA	Feasibility Analysis of Commercial Waste Collection Offering	2004-2005	\$25,000	MRSWA Operating Budget	
MRSWA	Feasibility Analysis of Commercial Recyclables Collection Package Offering	2004-2005	\$25,000	MRSWA Operating Budget	
MRSWA	Feasibility Analysis of Sludge Composting	2004-2005	\$50,000	MRSWA Operating Budget	
MRSWA	Feasibility Analysis of Offering Document Destruction/Recycling Service	2006-2007	\$25,000	MRSWA Operating Budget	
MRSWA	Feasibility Analysis of Establishing a Universal Waste Management Service	2007-2008	\$25,000	MRSWA Operating Budget	

## **Conclusions:**

1. Overall Recycling Rate: 33%

MSW Rate: 27%

- 2. Recycling Facility produces high quality materials that can be competitively marketed.
- 3. Transfer station has capacity for the 20 year planning period.
- 4. NRRA has disposal capacity for a 20 year planning period.

#### **SECTION 1.0**

#### INTRODUCTION

#### 1.1 Overview

This "Montgomery Regional Solid Waste Management Plan" (Plan) has been prepared by the Montgomery Regional Solid Waste Authority on behalf of Montgomery County (County), the Towns of Blacksburg and Christiansburg, and the Virginia Polytechnic Institute and State University (Virginia Tech).

This Plan has been prepared in compliance with the "Regulations for Solid Waste Planning," Amendment 1" (9 VAC 20-130-10 et. Seq.) of the State of Virginia (State regulations). The State regulations require planning regions "to develop a solid waste management plan or amend an existing solid waste management plan and submit it for approval...." A complete, revised, solid waste management plan in compliance with State regulations must be submitted to the State's Department of Environmental Quality by July 1, 2004.

According to the State regulations, the solid waste management plan should include:

- An integrated waste management strategy
- A discussion as to how the plan will be implemented
- Objectives for solid waste management within the jurisdiction
- Definition of incremental stages of progress toward the objectives and a schedule for their implementation
- Descriptions of the necessary funding and resources, including consideration of fees dedicated to the development of future facilities
- A strategy for the provision of the necessary funds and resources
- A strategy for public education and information on source reduction, reuse, and recycling
- Consideration of public and private sector partnerships and private sector participation in execution of the plan.<sup>1</sup>

The State regulations require that a minimum recycling rate of 25% of the total municipal solid waste generated annually in each region shall be maintained. The plan must describe how this rate will be met or exceeded.

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<sup>&</sup>lt;sup>1</sup> The State regulations also recommend that "Existing private sector recycling operations should be incorporated in the plan and the expansion of such operations should be encouraged."

#### 1.2 Plan Purpose and Objectives

The Montgomery Regional Solid Waste Management Plan has two primary goals:

- To ensure the County's continued compliance with the Virginia Waste Management Board's "Regulations for Solid Waste Management Planning, Amendment 1."
- To present a reliable, long-term plan for managing the County's solid wastes over the 20-year planning period.

Each of these objectives is discussed below.

#### 1.2.1 Continued Compliance with State of Virginia Solid Waste Planning Regulations

In the <u>Regulations for Solid Waste Management Planning</u>, <u>Amendment 1</u>, there are two primary requirements with which planning regions must comply:

- Consideration and Addressing of State Solid Waste Hierarchy The State regulations require each planning region to develop a comprehensive and integrated solid waste management plan that, at a minimum, considers and addresses all components of the following hierarchy of solid waste management methods:
  - Source reduction
  - Reuse
  - Recycling
  - o Resource Recovery (waste-to-energy)
  - Incineration
  - Landfilling
- Achievement of State Recycling Goal It is the policy of the State that
  each planning region achieves a minimum recycling rate of 25% of the total
  municipal solid waste generated annually within the region. The local solid
  waste management plan must describe how this goal will be achieved and
  maintained through the implementation of local recycling programs and
  systems.

#### 1.2.2 Provision for Solid Waste Management Needs over the Planning Period

The following types of solid waste are generated in Montgomery County, Virginia.

- Municipal solid waste
- Construction and demolition (C&D) waste
- Regulated medical wastes
- Special wastes, such as used oil and sludges

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The Plan must identify and ensure that the facilities and services needed to properly manage these waste streams are planned for and will be available throughout the 20-year planning period.

The proper management of these waste streams is important for the following reasons:

- **Sanitation** To protect and promote public health through the elimination of wastes that can carry and breed agents of infection or disease.
- **Aesthetics** To protect and enhance the aesthetics of the local community through the minimization of litter, unsightly waste storage, and odor.
- Environmental Protection To minimize the environmental impacts associated with the management of wastes as well as the manufacturing of products and materials that ultimately end up in the waste stream.
- Energy and Natural Resource Conservation To minimize the use of natural mineral and energy resources utilized in the production of products and materials that are ultimately disposed, and the waste management systems for these disposed products and materials.
- **Economic Development** To ensure the implementation of efficient, economical, and environmentally sustainable waste management systems that enhance the economic growth of the local community.

## 1.3 Planning Process and Public Participation

This Plan was developed through the sponsorship of the Montgomery Regional Solid Waste Authority (MRSWA), which is the designated lead agency for the region comprised by Montgomery County, Virginia, the Towns of Blacksburg and Christiansburg, and the Virginia Polytechnic Institute and State University (Virginia Tech).

MRSWA assumed the lead responsibility for developing the update of the Montgomery Regional Solid Waste Management Plan and, in this role, has provided the funding for the consulting engineering services required to update the Plan.

Oversight of the Plan update was performed by the Montgomery Regional Solid Waste

Management Plan Steering Committee, which is composed of the individuals listed in Table 1-1.

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Table 1-1. Solid Waste Management Plan Steering Committee				
Jurisdiction/Organization	Representative	Title		
Town of Diocksham	Stephan Martin	Solid Waste Coordinator		
Town of Blacksburg	Susan Garrison	Superintendent – Parks and Landscape		
Town of Christiansburg	Barry Helms	Asst. Town Manager		
N	Ron Bonnema	County Engineer		
Montgomery County	Linda Crable	Asst. General Services Manager		
	Randall Bowling	Executive Director		
MRSWA	Tim McCoy	Director of Operations		
	Tim Myers	Recycling Coordinator		
	Theresa Sweeney	Education Coordinator		
Virginia Tech	Larry Bechtel	Recycling Coordinator/Solid Waste Manager		

The Steering Committee met numerous times to provide data and information, provide input and guidance regarding the selection and evaluation of Plan alternatives, and review the draft and final versions of the Plan. The Committee's assistance in the development of this Plan is both recognized and appreciated.

The draft Plan was presented at a public hearing which was held on \_\_\_\_\_ and attended by \_\_\_\_\_ persons. The comments received during the draft hearing are summarized in Table 1-2 and were addressed in the final version of the Plan.

Table 1-2. Comments Received At Public Hearing To Review Draft Solid Waste Management Plan Steering				
Jurisdiction/Organization	Representative	Comment		

#### **SECTION 2.0**

#### **DESCRIPTION OF REGION**

## 2.1 General County Information

Montgomery County, Virginia, is located in the southwestern part of Virginia in the region known as the New River Valley. This region takes its name from the New River, the nation's oldest and the world's second oldest river, and includes the Counties of Floyd, Giles, Montgomery, and Pulaski, and the City of Radford. This part of southwestern Virginia was first explored in 1671 when an expedition discovered the New River. Pioneers from Pennsylvania and eastern Virginia began settling the region in the early 1700s. These early settlers were predominantly of German, French, Scotch-Irish, and English descent.

Montgomery County traces its origin back to 1776 when it was formed and named after General Richard Montgomery, an American hero of the French and Indian War and the American Revolution.

The first settlement, Draper's Meadow, was established in the 1740s but was destroyed by Shawnee Indians during the French and Indian War.

Christiansburg, the County seat, was incorporated in 1792 and named in honor of Colonel William Christian. This community was an important stop on the Wilderness Road, which roughly corresponds to the present day US Route 11.

Blacksburg was incorporated in 1871. The Town originated on tracts of land donated by William Black, for whom it was named, and was established at the same site as the previous settlement of Draper's Meadow.

Today, the Towns of Blacksburg and Christiansburg are the population centers of the County and are located approximately 35 miles southwest of the City of Roanoke. Blacksburg is home to Virginia Polytechnic Institute and State University (Virginia Tech). Founded in 1872 as a land-grant college, Virginia Tech is the largest university in Virginia and one of the country's leading research institutions. Christiansburg remains the County seat and is the retail center of the New River Valley (see Figure 2-1).

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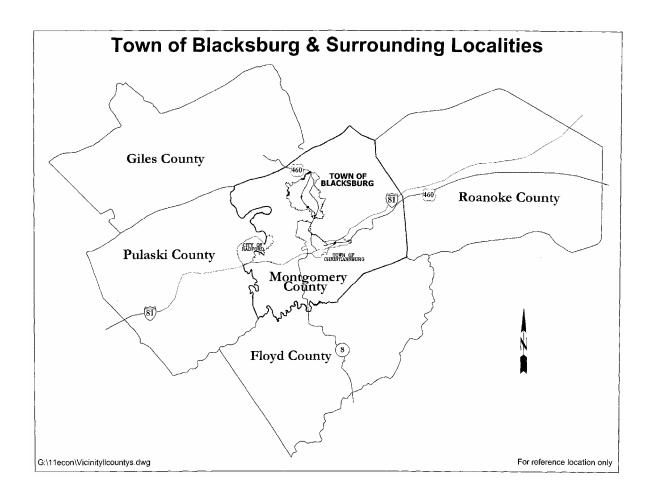


Figure 2-1
Map of the Montgomery County Solid Waste Planning Region

## 2.2 Geography

Montgomery County has a land area of 393 square miles and lies in the broad picturesque area between the Appalachian Plateau and the Blue Ridge Mountains.

A divide, separating the New River drainage basin to the Gulf of Mexico and the Roanoke River drainage basin to the Atlantic Ocean, crosses the County roughly through the center from north to south. The New River drainage basin is a gently rolling land surface, whereas the Roanoke River drainage basin is a hilly land surface. Thus, the topography of the County varies from gently rolling to steep mountainous terrain, with elevations varying from 1,300 to 3,700 feet above sea level. The majority of the County is at an elevation of 2,000 feet.

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The mountainous terrain of Montgomery County has resulted in the formation of a wide variety of soil types. Soils range from shallow, steep soils on the mountainsides to the deep, fertile soils of the valleys. Approximately 7% of the County's total area is covered by soils considered suitable for urban uses, and 39% of the soils are considered well suited for agriculture.

Land is the County's greatest natural resource. Another major natural resource is water. Groundwater is generally of good quality, and availability of groundwater is highly variable in different parts of the County. Most wells yield less than 20 gallons per minute, but yields of over 100 gallons per minute are not uncommon. The most productive well in the County yields 703 gallons per minute. The New River, one of the major water resources in southwestern Virginia, provides the water supply for the Blacksburg-Christiansburg-VPI Water Authority.

Nearly 60 percent of Montgomery County is forested, and approximately 7 percent of this forest land lies in the Jefferson National Forest, with the remainder being in private ownership. The forest consists of mixed pine and hardwoods and contains over 200 million cubic feet of growing stock.

Montgomery County contains a variety of mineral resources. Limestone is currently the only mineral being mined or quarried. In the past, Montgomery County has produced commercial quantities of coal, iron, shale, sandstone, and gold. Zinc, lead, copper, and manganese are known to occur in the County, but have never been utilized commercially.

As a result of its limestone geology, much of Montgomery County exhibits "karst" topography, which is characterized by sinkholes and cave formations. As current solid waste regulations prohibit the location of landfills in karst topography, this geologic feature severely limits the construction of new landfill disposal facilities in the County.

## 2.3 Transportation Network

The planning area does have access to several major transportation arteries. Interstate 81 can be accessed at four locations in the planning area. The area is served by Norfolk-Southern Railway, which maintains two active lines in the planning area. Access to these transportation features improves the planning area's ability to get recyclable commodities to markets.

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In addition to these major transportation facilities, transportation in the planning area is defined by three roads U.S. 460, U.S. 11, and VA 114. U.S. 460 provides a north-south travel route for most of the planning area; however, it is truly an east-west connector with Roanoke, VA and Bluefield, WV. U.S. 11 connects Radford and Christiansburg. U.S. 11 and U.S. 460 are the same facility east of Christiansburg. VA Route 114 is a third internal east-west connector in the planning area. VA 114 (Peppers Ferry Road) is a major commuter route to and from Pulaski County and the Blacksburg/Christiansburg area. Two other secondary roads bear significant commuter and cargo transportation roles. These are Prices Fork Road west of Blacksburg and VA Route 8 (Riner Road) south of Christiansburg. These roads will shape the collection system and location of solid waste management facilities in the Planning Area.

Within the towns U.S. 460 (and U.S. 11 in Christiansburg) continues to be the major transportation artery. There are business and bypass components to U.S. 460 in both Towns.

Figures 2-2 and 2-3 illustrate the transportation network in the planning area and the planning area in relation to the rest of the Commonwealth, respectively.

## 2.4 Incorporated Areas

#### 2.4.1 Town of Blacksburg

In 1797, William Black donated 38 acres of land, which was divided into a grid now referred to as the Sixteen Squares. A year later, the Town of Blacksburg was incorporated with little more than two dozen families. The population of Blacksburg in 1850 totaled 333 people, 63 of whom were slaves. As of January, 2004, Blacksburg was the largest town in Virginia, with a healthy, culturally diverse population of 41,065 citizens living on just over 12,000 acres of land at the foot of the Jefferson National Forest.

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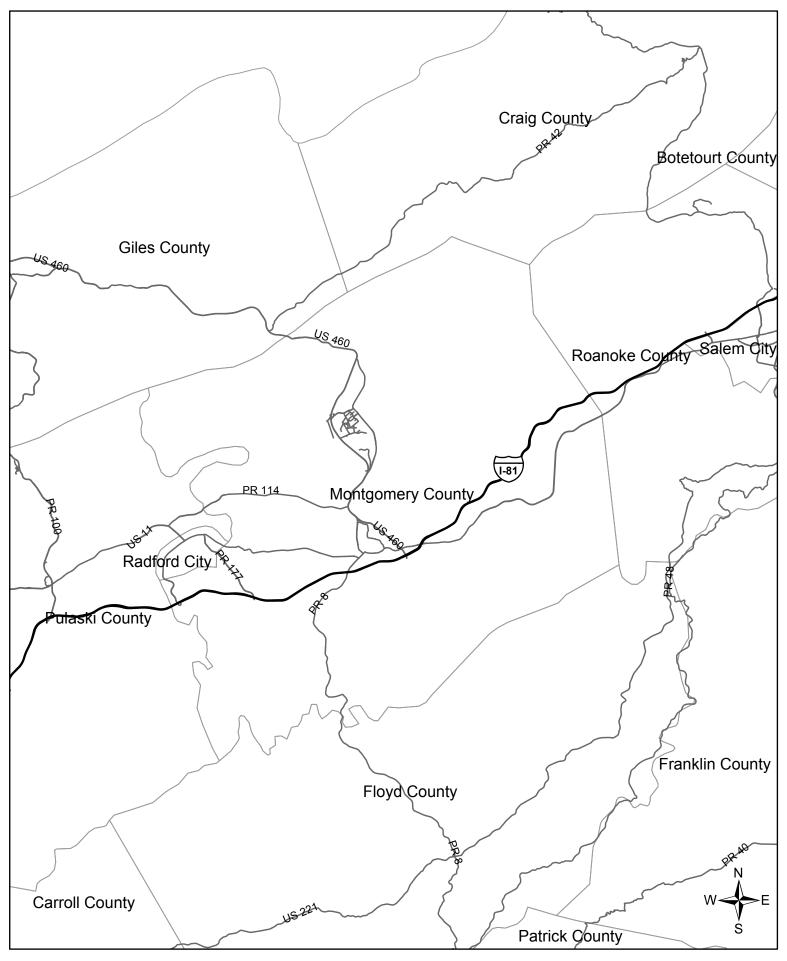


Figure 2-2. Montgomery County Transportation Network

0 2.5 5 10 Miles

INCORPO

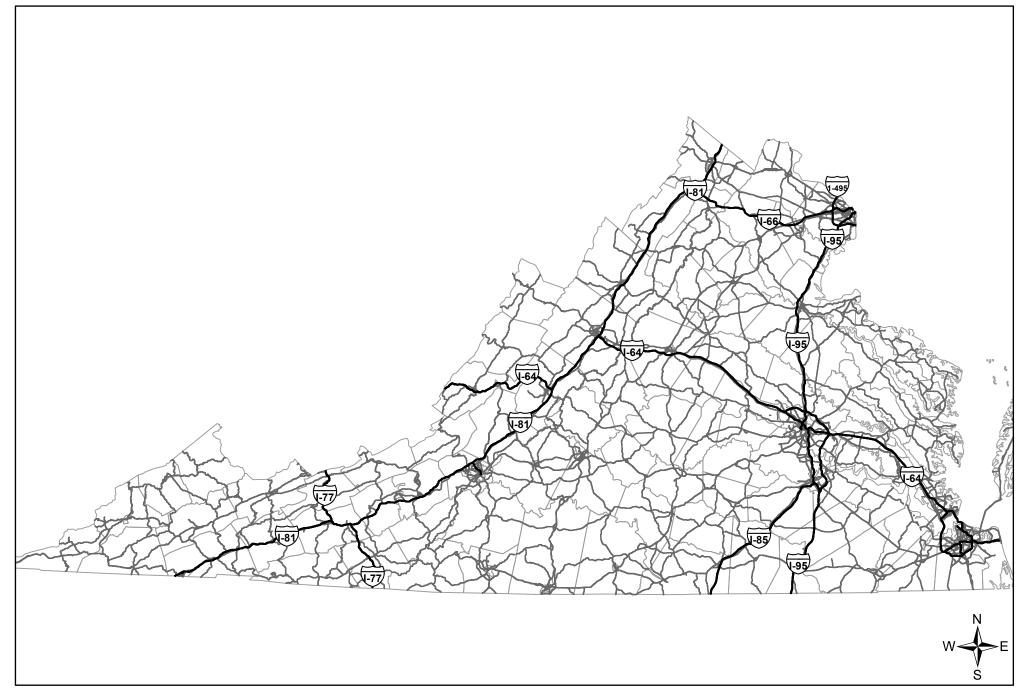
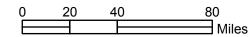


Figure 2-3. State of Virginia Transportation Network





Job No: 11928.36 I:\Engineering\ENG\11928.36\Figure2-3.mxd The 2000 census reported Blacksburg's population as 39,573, approximately 14.4 percent higher than reported in the 1990 census. Virginia Tech, the Town's major employer and university, has exceeded its goal of 25,000 students. With the graduate student population projected to increase, population will grow at almost 2 percent a year at a decreasing rate over the next ten years, with growth leveling off to around 1 percent per year. At this rate, the population will be approximately 46,750 in the year 2010, and is expected to grow to 57,400 by 2046. Approximately 52.8 percent of the land in Blacksburg is undeveloped.

## 2.4.2 Town of Christiansburg

Christiansburg, the first town incorporated in Montgomery County, is the County seat.

Christiansburg is the second largest town in Virginia and can rightly call itself the Home of

Heroes. Its residents and long term visitors have included Davy Crockett, Booker T. Washington,

Daniel Boone, Lewis & Clark, George Washington, and many, many others.

The Town of Christiansburg plays a major role in the thriving economic environment of the New River Valley, being the home of the New River Valley Mall and several shopping centers which include many national chain retailers/restaurants. Christiansburg also hosts a wide variety of locally owned businesses including an old fashioned drive-in theater, one of the few left in the country. Christiansburg proudly boasts its history as the location where Daniel Boone crossed the Continental Divide entering the wilderness. The Chamber hosts the annual Wilderness Trail Festival in Christiansburg as a tribute to Christiansburg history and as a fun family outing.

According to the 2000 U.S. Census, in 2000 the Town had a total population of 16,947. The Town occupies an area of 13.9 square miles and has a population density of 1,217 persons per square mile.

There are 7,430 housing units at an average density of 206.1/km<sup>2</sup> (533.6/mi<sup>2</sup>). The racial makeup of the town is 93.13% White, 4.83% African American, 0.21% Native American, 0.41%

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Asian, 0.02% Pacific Islander, 0.48% from other races, and 0.91% from two or more races. 0.99% of the population is Hispanic or Latino of any race.

There are 7,093 households out of which 31.2% have children under the age of 18 living with them, 52.6% are married couples living together, 11.3% have a female householder with no husband present, and 32.8% are non-families. 27.0% of all households are made up of individuals and 9.5% have someone living alone who is 65 years of age or older. The average household size is 2.35 and the average family size is 2.86.

In the Town the population is spread out, with 23.8% under the age of 18, 8.0% from 18 to 24, 33.3% from 25 to 44, 22.8% from 45 to 64, and 12.1% who are 65 years of age or older. The median age is 35 years. For every 100 females there are 92.7 males. For every 100 females age 18 and over, there are 89.0 males.

## 2.4.3 Virginia Tech

From a meager beginning in October of 1872, the Virginia Polytechnic Institute and State University, popularly known as Virginia Tech, has evolved into a comprehensive university of national and international prominence. As Virginia's largest university, with 25,600 students, and one of the top 50 research institutions in the nation, it is an institution that firmly embraces a history of putting knowledge to work.

Located in Blacksburg, Virginia Tech is comprised of eight colleges and graduate schools, which offer 60 bachelor's degrees and 110 master's and doctoral degree programs. The university's main campus, which includes 100 buildings and an airport, covers an area of 2,600 acres and has an adjacent corporate research center.

## 2.5 The Montgomery Regional Solid Waste Authority

In October 1990, Montgomery County and the Towns of Christiansburg and Blacksburg petitioned for designation as a region that included the County and Towns as well as Virginia Tech.

To serve the region's solid waste management needs, the Montgomery Regional Solid Waste Authority (the Authority) was created in December 1994, as a political subdivision of the Commonwealth

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of Virginia pursuant to the Water and Sewer Authorities Act. In July 1995, the Authority was given control of the Mid-County landfill and the recycling operations. Anticipating the closure of the Mid-County Landfill in 2002, the Authority built a "Recyclables Processing Facility" in 1996 and constructed a Transfer Station in 1998.

One of the benefits of the formation of the Authority is that the designated region has a responsibility to reach or exceed the recycling mandates, but each individual member is not so tightly held to the reduction percentages, so long as they are doing their part and the region as a whole is successful.

## 2.6 Economy

Montgomery County continues to grow and support a well-diversified economy. Local residents enjoy the enhanced quality of life provided by Montgomery County's diverse economic base in which a wide variety of skilled and professional employment opportunities exist.

Since the 1970s, Montgomery County's industrial base has experienced an overall picture of growth. Government, manufacturing, trade, and service industries are strongly represented in the County.

Directly related to the growth and success of the service and trade sectors of the economy is tourism in Montgomery County. In addition to Montgomery County's natural beauty, cultural attractions, and historic assets, the presence of Virginia Tech and Radford University has made the County a desirable destination for visitors. Montgomery County is an events-oriented community, wherein expenditures from travelers attending major university and community events generate a significant amount of revenue for the County. Recognizing the importance of tourism, community leaders continue to work toward the County's tourism development.

Montgomery County's income figures are heavily influenced by the large student population in the area, which tends to diminish the income figures. In 2001, there were 37,000 full and part-time students at Virginia Tech in Montgomery County and Radford University in the City of Radford, with the student population representing one third of the total population for these two localities. Data on median family incomes is presented in Table 2-1.

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Table 2.1 Projected Median Family Income					
Locality	1970	1980	1990	1996	1999
Montgomery	\$8,255	\$17,084	\$33,128	\$34,213	\$32,330
Virginia	\$9,048	\$20,423	\$38,213	\$47,549	\$46,677
United States	\$9,585	\$19,909	\$35,225	\$45,161	\$41,994

Source: Virginia Population Estimates: Weldon Cooper Center for Public Service and U.S. Bureau of the Census

#### 2.7 Demographics

#### 2.7.1 Current Population

The most recent data show the estimated population of Montgomery County at 83,629 in 2000 (see Table 2-2). This figure represents a 13.1% increase since the last official census in 1990. While this growth rate is less than the 16.4% of the previous decade, the County continues to enjoy a manageable rate of growth in population and the highest growth rate west of Richmond, Virginia.

Table 2.2 Population of New River Valley					
Locality	2000	1990	1980	Percent Change 1990-2000	Percent Change 1980-1990
Montgomery County	83,629	73,913	63,516	13.14%	16.4%
Blacksburg	39,573	34,590	30,638	14.41%	16.4%
Christiansburg	16,947	15,004	10,345	12.95%	45.0%
City of Radford	15,859	15,940	13,225	-0.5%	20.5%
Giles County	16,657	16,366	17,810	1.78%	-8.1%
Floyd County	13,874	11,965	11,563	15.95%	3.8%
Pulaski County	35,127	34,496	35,229	1.8%	-2.1%
New River Valley	165,146	152,680	141,343	8.16%	8.0%

Source: Virginia Population Estimates: Weldon Cooper Center for Public Service and U.S. Bureau of Census

#### 2.7.2 Population Projections

Population projections, based on data provided by the Virginia Employment Commission, are presented for Montgomery County in Table 2-3. As indicated, the County population is projected to grow at rates of 0.70% to 0.83% from 2004 to 2030. The projected County population in the year 2024 – the last year of the planning period – is projected to be 100,680, an increase of 14,253 persons or 16.5% over the County's 2004 population.

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Table 2-3. Montgomery County, VA
Historical Population Data and Projected Population Growth (1)

		Black	sburg			
Year	Population (2)	Total (3)	w/o VA Tech	Christiansburg (4)	VA Tech (5)	Uninc. County Pop.
2000	83,629	39,573	30,652	16,947	25,783	27,109
2001	84,320	40,238	31,317	17,087	26,244	26,995
2002	85,016	40,914	31,993	17,228	26,713	26,874
2003	85,719	41,602	32,681	17,370	27,191	26,746
2004	86,427	42,301	33,380	17,514	27,677	26,612
2005	87,141	43,012	34,091	17,659	28,172	26,470
2006	87,861	43,735	34,814	17,805	28,676	26,321
2007	88,586	44,470	35,549	17,952	29,189	26,165
2008	89,318	45,217	36,296	18,100	29,711	26,001
2009	90,056	45,977	37,056	18,249	30,242	25,829
2010	90,800	46,750	37,829	18,400	30,783	25,650
2011	91,486	47,035	38,114	18,539	30,783	25,912
2012	92,178	47,322	38,401	18,679	30,783	26,176
2013	92,874	47,610	38,689	18,820	30,783	26,443
2014	93,576	47,901	38,980	18,963	30,783	26,713
2015	94,283	48,193	39,272	19,106	30,783	26,984
2016	94,996	48,487	39,566	19,250	30,783	27,259
2017	95,714	48,782	39,861	19,396	30,783	27,535
2018	96,437	49,080	40,159	19,542	30,783	27,815
2019	97,166	49,379	40,458	19,690	30,783	28,097
2020	97,900	49,680	40,759	19,839	30,783	28,381
2021	98,588	49,974	41,053	19,978	30,783	28,635
2022	99,281	50,270	41,349	20,119	30,783	28,892
2023	99,978	50,567	41,646	20,260	30,783	29,151
2024	100,680	50,867	41,946	20,402	30,783	29,411
2025	101,388	51,168	42,247	20,546	30,783	29,674

#### Notes:

- 1. Population projections made by using published population projections for each jurisdiction for the years 2000, 2010, 2020 and 2030 and assuming a linear population growth rate for the intervening years.
- 2. Montgomery County population for the year 2000 published in <u>Census 2000</u>. Population projections for the years 2010, 2020, and 2030 for Montgomery County made by the Virginia Employment Commission on 05/03.
- 3. Population projections for the years 2010, 2020, and 2030 for the Town of Blacksburg published in Blacksburg 46 (Appendix A), (November 27, 2001). The on-campus population of Virginia Tech was reported to be 8,921 persons in 2002 and assumed to remain constant over the planning period.
- 4. Population projections for the years 2010, 2020, and 2030 for the Town of Christiansburg made by assuming the same population growth rate as predicted for Montgomery County.
- 5. Population projections for the years 2010, 2020, and 2030 for Virginia Tech published in <u>Blacksburg</u> 46 (Appendix A), (November 27, 2001).

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#### **SECTION 3.0**

## SOLID WASTE STREAMS AND QUANTITIES

#### 3.1 Introduction

This section provides information on the quantities of solid waste that are currently generated in Montgomery County, Virginia. It also presents future quantity projections for each major waste stream and substream generated in the region.

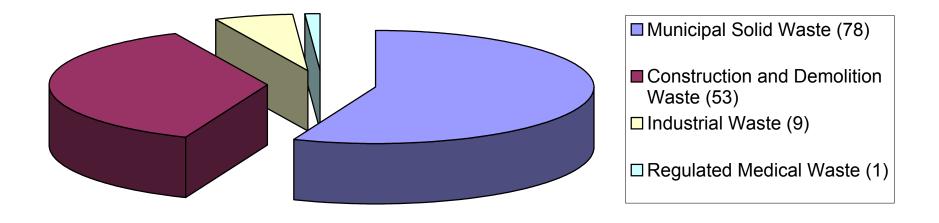
The "Regulations for Solid Waste Management Planning – Amendment 1" (State Planning Regulations) promulgated by the Virginia Waste Management Board (VWMB) require that planning regions document the amounts and types of solid wastes that are generated within the planning region.

As indicated in Table 3-1 (and depicted in Figure 3-1), there are four major solid waste streams generated within Montgomery County that are covered by the State Planning Regulations. The purpose of this section is to provide information on the quantities of each solid waste stream that are generated, recycled, and disposed. In addition, "per capita" generation rate (i.e., the equivalent amount of solid waste generated per person in the County) are calculated and are used to develop estimates of the quantities of each waste stream that are projected to be developed over the 20-year planning period.

Table 3.1. Montgomery County, VA – Major Solid Waste Streams					
Waste Stream	Quality Generated (Tons/Year)	Per Capita Generation Rate (Lbs/Person/Day)	Percent		
Municipal Solid Waste (MSW)	78,222	5.07	56%		
Construction and Demolition Wastes (C&D)	52,867	3.41	37%		
Industrial Waste	9,038	0.58	6%		
Regulated Medical Wastes	945	0.06	1%		
Totals	141,571		100%		

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Figure 3-1 - Montgomery County Planning Region - Major Solid Waste Streams (Thousand Tons Per Year)



## **Waste Types and Special Wastes**

#### 3.1.1 Introduction

The Virginia Solid Waste Planning Regulations require that planning regions develop waste generation estimates and future projections for a number of different types of solid waste streams as well as specific substreams of these waste streams that are referred to as "special wastes."

The statutory language that identifies the types of waste streams and special wastes that must be addressed in the Plan is presented in Table 3-2, along with a listing of the waste streams and special wastes for which generation data and future tonnage estimates must be developed.

Table 3-2. VWMB Waste Type and Special Waste Planning Requirements				
Section	Requirement	Waste Types/Special Wastes		
9 VAC 20-130-120. Mandatory Plan Contents	A methodology shall be utilized to monitor the amount of solid waste of each type produced	MSW, C&D waste, industrial waste, regulated medical waste, white goods, friable asbestos, petroleum-contaminated soil, principal recyclable materials, Supplemental Recyclable materials		
9 VAC 20-130-150. Incorporated data.	Estimates of solid waste generation from households, commercial institutions, industries and other types of sources should identify special wastes.	Stumps, land-clearing debris and construction wastes, motor vehicle tires, waste oil, batteries, sludges, mining wastes, septage, agricultural wastes, spill residues.		
9 VAC 20-130-165. Waste Information and Assessment Program.	Permitted facility reports shall identify solid waste by the following categories:	Municipal solid waste; construction and demolition debris; industrial waste; regulated medical waste; vegetative and yard waste; incinerator ash; sludge; tires; white goods; friable asbestos; petroleum contaminated soil; other special wastes.		

## 3.1.2 Waste Types

A closer examination of the State planning requirements indicates that planning regions must address the management of six different types of solid waste streams that may be generated by the planning community. A primary reason for distinguishing between these solid waste

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streams is that the disposal requirements, and therefore future disposal needs, vary for each waste stream. These six solid waste stream types are briefly described below.

 Municipal Solid Waste – Municipal solid waste, or MSW, is non-hazardous solid waste that is generated by the residences, businesses and institutions in a community.

The State of Virginia has required that a minimum recycling rate of 25% of the MSW stream generated within each planning region be maintained through the 20-year planning period.

As required under federal regulations, MSW, which includes yard wastes, must be disposed in engineered, lined landfills commonly referred to as "Subtitle D" landfills. The liner systems in Subtitle D landfills are designed to serve as a barrier that prevents leachate generated within the landfill from migrating to the groundwater table beneath the landfill while simultaneously allowing the leachate to be collected and removed from the landfill for treatment.

MSW Subtitle D landfills are allowed to dispose of other types of non-hazardous wastes, such as construction and demolition wastes, or industrial solid wastes. MSW landfills are not allowed, however, to dispose of regulated medical wastes.

- Construction and Demolition Waste Construction and demolition waste, or C&D waste, is waste that is generated during the construction, remodeling, repair, or destruction of pavements, houses, commercial buildings, and other structures. C&D wastes are also required to be disposed of in engineered, lined landfills. However, the design requirements for these landfills are not as stringent as those established for MSW landfills.
- Industrial Solid Waste is non-hazardous solid waste that is generated by manufacturing or industrial processes. Industrial solid waste is generally disposed of on site by the generating industry. No federal regulations currently exist that establish minimum standards for the disposal of industrial solid wastes. Currently, state regulations do not require that these wastes be disposed in lined landfills.
- Regulated Medical Waste refers to infectious, potentially infectious and special wastes that are produced by hospitals, clinics, doctors' offices and other medical and research facilities.<sup>2</sup> In Virginia, regulated medical wastes are addressed under the Regulated Medical Waste Management Regulations" (9 VAC 20-120-10 et seq.) as promulgated by the Virginia Waste Management Board. Most regulated medical waste is currently incinerated.

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U.S. Congress, Office of Technology Assessment. <u>Finding the Rx for Managing Medical Wastes</u>, OTA-)-459 (Washington, DC: U.S. Government Printing Office, September 1990.)

- Mining Wastes are non-hazardous solid wastes that are generated during the mining and subsequent processing of ores. Unless one or more active mines are located within a planning region, it is unlikely that mining wastes are generated by the local community. Mining wastes are generally not required to be disposed of in landfills.
- **Agricultural Waste** is solid waste produced from farming operations or related commercial preparation of farm products for marketing. As with industrial solid waste, no federal regulations currently exist that establish minimum standards for the disposal of agricultural solid wastes, which is generally disposed of on farms.

The waste stream types covered by the State Planning Regulations correspond, for the most part, with the waste stream types addressed through the federal "Resource Conservation and Recovery Act" (RCRA) Program, as shown in Figure 3-2. The RCRA waste types include hazardous waste, which is not addressed in the State Planning Regulations. Although not indicated in Figure 3-2, the RCRA Program also covers regulated medical waste, which is considered a subset of the MSW stream. Interestingly, as indicated in the Figure, the MSW waste stream (at 232 million tons per year) accounts for only 9% of the 2.6 billion tons of solid waste generated annually that is regulated under RCRA.

Based on a review of solid waste data provided by the MRSWA, the Towns of Blacksburg and Christiansburg, and Virginia Tech, it appears that mining wastes and agricultural wastes are not generated in significant quantities within the County. Therefore, this plan will provide current quantities and waste projections for four major waste streams – namely, municipal solid waste, construction and demolition debris, industrial wastes and regulated medical wastes.

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<sup>&</sup>lt;sup>3</sup> U.S. EPA. "Waste Generation in the United States". (Presentation made at SWANA's Annual Executive Seminar, San Francisco, CA, January 17, 2004). It should be noted that "Bevill Wastes" refer to waste types that are not directly regulated by the U.S. EPA and are named after Congressman Bevill. These waste types include mining wastes, agricultural wastes and electric utility ash.

The RCRA Program

Total Quantity of Wastes (2.6 billion tons, excluding wastewaters)

Industrial D Construction & Demolition (350)

Other (6)

Municipal Solid Waste (232)

Waste (232)

Special Waste: Bevill (1782)

Figure 3-2 Federal RCRA Program – Solid Waste Generation in the US

# 3.1.3 Special Wastes

In addition to the six major waste stream types, the State planning regulations require that planning regions develop estimates for a number of waste substreams, materials or products that are either recyclable or that require special handling. As indicated in Table 3-3, these special wastes are substreams of the MSW, C&D or Industrial Solid Wastes.

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# Table 3-3 Special Wastes Required to be Addressed in Solid Waste Management Plans

			Solid Wa	ste Stream		
Special Waste Type	MSW	C&D	Industrial Waste	Reg. Med. Waste	Mining Waste	Agric. Waste
Principal Recyclable Materials	X					
Supplementary Recyclable Materials	X	X	X			
White Goods	X					
Stumps		X				
Land-Clearing Debris		X				
Motor Vehicle Tires	X					
Waste Oil	X					
Batteries	X					
Sludges			X			

Based on a review of solid waste data provided by the MRSWA, Montgomery County, the towns of Blacksburg and Christiansburg, and Virginia Tech, it appears that the following special wastes are not generated in significant or measured quantities within the County nor will be in the future:

- Friable Asbestos
- Petroleum-Contaminated Soil
- Spill Residues
- Septage.

Therefore, current quantities and waste projections are not provided for these special wastes in this plan.

Alternatively, waste tonnage data is provided for a number of special wastes and recyclable materials for which planning information is required by the State. These special wastes and recyclable materials are described below.

• **Principal Recyclable Materials** – Principal recyclable materials are materials that are contained in municipal solid waste that can be recycled.

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- Such materials include paper, metal (excluding automobile bodies), plastic, glass, yard waste, wood, and textiles.
- Supplemental Recyclable Materials are materials that are generated in the MSW, C&D and Industrial Waste streams that, when recycled or reduced, can be included in the calculation of a locality's recycling rate. Supplemental recyclable materials include waste tires, used oil, used oil filters, and used antifreeze, automobile bodies, construction wastes, demolition waste, debris waste, batteries, ash, sludge and large diameter tree stumps.
- White Goods refer to large appliances, many of which are coated with white enamel and are therefore referred to as "white" goods. Such appliances include stoves, clothes washing and drying machines, refrigerators, freezers, air conditioners and dehumidifiers and other large appliances. The freon contained in some of these appliances, such as refrigerators and air conditioners, must be removed by a technician before the appliance can be recycled.
- Stumps and Land Clearing Debris The clearing of land for site development generates solid wastes consisting mainly of stumps (greater than 6 inches in diameter), boulders, rocks, brush and soil.
- **Motor Vehicle Tires** Waste tires are generated by passenger cars and trucks. Because waste tires are difficult to recycle, the State of Virginia enacted a waste tire tax to fund the transportation and management of the 7 million waste tires that are generated annually in the Commonwealth.
- Waste Oil Waste oil refers to used oil from residential and commercial vehicles. While the majority of waste oil is collected through commercial vehicle service centers and retail establishments for recycling, some local governments operate used oil collection programs.
- **Batteries** This special waste category includes both lead acid batteries (used in automobiles) as well as dry cell batteries (used in flashlights, watches etc.).
- Sludges Sludges are mixtures of liquids and solids that are generated in manufacturing or mining processes, as well as water and wastewater treatment plant operations. To be considered a solid waste, a sludge must pass a "paint filter" test designed to ensure that the sludge does not contain free liquids. (Liquid wastes are prohibited from disposal in MSW Subtitle D landfills.)

## 3.1.4 Per Capita Generation Rates

The MRSWA, as well as Montgomery County, the Towns of Blacksburg and Christiansburg, and Virginia Tech, annually report the quantities of solid wastes that are generated, recycled, and disposed in the County in Locality Recycling Rate Reports which are

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submitted annually to Virginia Department of Environmental Quality (VDEQ). The solid waste data presented below for each jurisdiction has been derived from the Locality Recycling Rate Reports submitted for the calendar year 2002. The data in these reports were reviewed, and in some cases revised, in light of the scale data provided for each jurisdiction by the MRSWA. Finally, where local data were not available for certain waste streams or special waste types, national generation data were referenced and utilized.

# 3.2 Town of Blacksburg

#### 3.2.1 Introduction

The purpose of this section is to present estimates of the quantities and types of solid waste streams and special waste substreams that will be generated by the residents, businesses and institutions in the Town of Blacksburg and which will require management over the twenty year period covered by the plan.

#### 3.2.2 Historical Solid Waste Quantities

Solid waste data for the Town of Blacksburg for calendar year 2002 is presented in Table 3-4. As indicated, the Town reported that almost 19,000 tons of municipal solid waste were generated in Blacksburg in 2002. Of this amount, about 5,800 tons were recycled and 13,100 tons were disposed, which resulted in an MSW recycling rate of 31%.

An additional 6,800 tons were recycled from other waste streams – including 1,100 tons of C&D waste and 5,200 tons of industrial waste. Therefore the "Calculated Recycling Rate" which includes "Principal Recyclable Materials" from the MSW stream and "Supplemental Recyclable Materials" from other waste streams, was 49% in 2002.

## 3.2.3 Per Capita Generation Rates

As indicated in Table 3-4, residents and businesses in Blacksburg generated almost 19,000 tons of municipal solid waste in 2002, which equates to a per capita generation rate of 3.24 pounds per person per day. In comparison, the US EPA reported a national MSW per capita generation rate of 4.4 pounds per person per day in 2001.

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		Recyc	led		Per Capita Generation Rate	
ste Types	Generated	<u>Tons</u>	<u>Percent</u>	Disposed	(Lbs/Person/Day)	Note
Municipal Solid Waste	18,937.51	5,815.56	31%	13,121.95	3.24	1
PRMs						
Recyclable Matls.		4,202.71				2
White Goods	413.81	4.50			0.07	3
Yard Wastes	2,272.50	1,608.35				
Subtotal		5,815.56				
SRMs						
Tires	530.91	51.59	0.10		0.09	4
Waste Oil		125.14				
Batteries	220.55	11.49	0.05		0.04	5
C&D		1,118.04				
Industrial		5,192.19				
Other		267.96				
Subtotal		6,766.41			1.16	
Total		12,581.97				
C&D Wastes	19,894.80	1,118.04	5.6%		3.41	6
Regul. Medical Waste	227.25	,			0.039	
Mining Wastes						
Agricultural Wastes						
Calculated Recycling Rate		48.95%				

The per capita generation rates for the other waste streams and special waste categories – including white goods, tires, batteries, C&D wastes and regulated medical wastes – were based on national rates reported by the US EPA, as no local data were available to develop these rates.

# 3.2.4 Waste Stream Projections

The per capita generation rates presented in Table 3-4 were used to estimate future waste quantities for each of the waste streams and special waste substreams for which projections are required by VDEQ.

To estimate future waste quantities, the per capita generation rates were assumed to remain constant over the 20-year period covered by the plan. The per capital generation rates, as presented in Table 3-4, are multiplied by the future population estimates presented in Table 2-3, to estimate future waste quantities. These are presented in Table 3-5 for the fiscal years 2004-2023 for the Town of Blacksburg.

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					Wast	e Streams	5				Spe	ecial Waste	s	
				Municipal Solid			Supplem.	Construct.	Regulated					
			Total	Publicly-Cont.	Prin. Recy	c Matl	Recycled	and Demol.	Medical					
Plan	Fiscal		MSW	MSW	MRF Mat. (3)	Yd Waste		Wastes	Wastes	White Goods		Waste Oil	<b>Batteries</b>	Sludges
<u>/ear</u>	<u>Year</u>	<u>Population</u>	Tons/Yr	Tons/Yr	Tons/Yr	Tons/Yr	Tons/Yr	Tons/Yr	Tons/Yr	Tons/Yr	Tons/Yr	Tons/Yr	Tons/Yr	Tons/Yr
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
1	2004	33,380	19,758	3,576	7,646	2,371	15,900	20,743	237	426	548	85	244	353
2	2004	34,091	20,179	3,652	7,809	2,422	16,238	21,185	242	436	560	87	244	361
3	2005	34,814	20,179	3,729	7,809	2,422	16,583	21,163	242	445	572	89	254	369
4	2007	35,549	21,042	3,808	8,143	2,525	16,933	22,091	253	454	584	91	260	376
5	2007	36,296	21,485	3,888	8.315	2,578	17,289	22,555	258	464	596	93	265	384
6	2009	37,056	21,934	3,969	8.489	2,632	17,263	23,027	263	473	609	95	271	392
7	2010	37,829	22,392	4,052	8,666	2,687	18,019	23,507	269	483	621	97	276	400
8	2011	38,114	22,560	4.083	8.731	2,707	18,155	23,685	271	487	626	97	278	403
9	2012	38,401	22,730	4,113	8,797	2,728	18,291	23,863	273	491	631	98	280	406
10	2013	38,689	22,901	4,144	8,863	2,748	18,429	24,042	275	494	635	99	282	410
11	2014	38,980	23,073	4,175	8.929	2,769	18.567	24,222	277	498	640	100	285	413
12	2015	39,272	23,246	4,207	8,996	2,789	18,706	24,404	279	502	645	100	287	416
13	2016	39,566	23,420	4,238	9,063	2,810	18,846	24,587	281	505	650	101	289	419
14	2017	39,861	23,595	4,270	9,131	2.831	18,987	24,770	283	509	655	102	291	422
15	2018	40,159	23,771	4,302	9,199	2,852	19,129	24,955	285	513	660	103	293	425
16	2019	40,458	23,948	4,334	9,268	2,874	19,271	25,141	287	517	665	103	295	428
17	2020	40,759	24,126	4,366	9,337	2,895	19,415	25,328	290	521	669	104	298	431
18	2021	41,053	24,300	4,397	9,404	2,916	19,555	25,511	292	524	674	105	300	435
19	2022	41,349	24,475	4,429	9,472	2,937	19,695	25,695	294	528	679	106	302	438
20	2023	41,646	24,651	4,461	9,540	2,958	19,837	25,880	296	532	684	106	304	441
lotes:														
1	Population	projections taken	from Table 2-	3.										
2	Future was	te quantities are	estimated by n	nultiplying the pro	jected population	by the "per	r capita gene	ration rate" for	each waste sti	ream. The per o	capita gene	ration rates fo	r each waste	stream we
	assumed t	o remain constan	t over the 20 y	ear planning peri	od, with tonnage	increases for	or each wast	e stream atribu	ted to populati	on growth.				
3	In FY 2002	, the Town of Bla	icksburg broug	ht 2,507.43 tons	of MSW and 91	9.54 tons of	f recyclables	to the MRSWA	facility. This re	epresented 18.1	% of the M	SW generated	I in the Town	that year.
4	The State	of Virginia estimat	tes that 38.7%	of the MSW stre	am is recyclable									
5	In its 2000	report, Franklin A	Associates esti	mates that yard v	waste comprised	12% of the	MSW stream	n.						
6		RMs were estima												
7	The US EP	A estimates that	, in 2000, a tot	tal of 350,000,00	0 tons of C&D wa	astes were	generated in	the U.S., equat	ing to a per ca	pita generation r	ate of 6.81	pounds per p	erson per da	у.
		&D generation ra												
8		medical waste is												
9		report, Franklin A												
10		report, Franklin A											person per	day.
11		report to the Stat												
12	In its 2000	report, Franklin A	Associates esti	mated that 1.94 r	million tons of lea	d-acid batte	ries were ae	nerated in the U	J.S. equating to	o a per capita de	eneration ra	te of 0.04 pou	inds per pers	on per day

# 3.3 Town of Christiansburg

## 3.3.1 Introduction

The purpose of this section is to present estimates of the quantities and types of solid waste streams and special waste substreams that will be generated by the residents, businesses and institutions in the Town of Christiansburg and which will require management over the twenty year period covered by the plan.

# 3.3.2 Historical Solid Waste Quantities

Solid waste data for the Town of Christiansburg for calendar year 2002 is presented in Table 3-6. As indicated, the Town reported that over 11,250 tons of municipal solid waste were generated in Christiansburg in 2002. Of this amount, about 3,100 tons were recycled and 8,200 tons were disposed, which resulted in an MSW recycling rate of 28%.

An additional 671 tons were recycled from other waste streams – including 126 tons of C&D waste and 239 tons of industrial waste. Therefore, the "Calculated Recycling Rate" which includes "Principal Recyclable Materials" from the MSW stream and "Supplemental Recyclable Materials" from other waste streams, was 31.6% in 2002.

## 3.3.3 Waste Stream Projections

The per capita generation rates for the other waste streams and special waste categories – including white goods, tires, batteries, C&D wastes and regulated medical wastes – were based on national rates reported by the US EPA, as no local data were available to develop these rates.

The per capita generation rates presented in Table 3-6 were used to estimate future waste quantities for each of the waste streams and special waste substreams for which projections are required by VDEQ.

To estimate future waste quantities, the per capita generation rates were assumed to remain constant over the 20-year period covered by the plan. The per capital generation rates, as presented in Table 3-6, are multiplied by the future population estimates presented in Table 2-3,

			/cled		Per Capita Generation Rate	
ste Types	<u>Generated</u>	<u>Tons</u>	<u>Percent</u>	<u>Disposed</u>	(Lbs/Person/Day)	<u>Notes</u>
Municipal Solid Waste	11,252.22	3,095.22	28%	8,157.00	3.58	1
PRMs		-				
Recyclable Matls.		2,487.00				2
White Goods	222.83	11.17			0.07	
Yard Wastes	1,350.27	597.05				
Subtotal		3,095.22				
SRMs						
Tires	285.89	151.00	53%		0.09	3
Waste Oil	-	72.00				
Batteries	118.76	73.00	61%		0.04	4
C&D	-	126.00				
Industrial	-	239.00				
Other	-	10.00				
Subtotal		671.00			0.21	
Total		3,766.22				
C&D Wastes	10,713.19	126.00	1.2%		3.41	5
Regul. Medical Waste Mining Wastes Agricultural Wastes	112.52				0.0429	6

- Data obtained from Town of Christiansburg's <u>Commonwealth of Virginia Locality Recycling Report For Calendar Year 2002</u>.
   2002 Town Population estimated to be 17,228 persons.
- Based on MRSWA 2002 scalehouse data, 11.17 tons of white goods and 5.82 tons of brush were delivered to the MRSWA from the Town of Christiansburg and were added as "Principle Recyclable Materials" to the Christiansburg Locality Report Recycling data.
- 3. Waste generation rate for tires based on national generation rate reported in US EPA Franklin Report.
- 4. Waste generation rate for batteries based on national generation rate reported in US EPA Franklin Report.
- 5. C&D waste generation rate based on US EPA estimate of 350,000,000 tons of C&D waste generated annually and U.S. population of 281.4 million persons, which equates to 6.81 pounds per person per day. (See US EPA "Waste Generation in the U.S. (Presentation made to SWANA Senior Executive Seminar, Jan. 17, 2004) The regional C&D generation rate was assumed to be 50% of the National rate
- 6. Regulated medical waste assumed to equal 1.2% of msw generation rate.

to estimate future waste quantities. These are presented in Table 3-7 for the years 2004-2023 for the Town of Christiansburg.

# 3.4 Montgomery County

## 3.4.1 Introduction

The purpose of this section is to present estimates of the quantities and types of solid waste streams and special waste substreams that will be generated by the residents, businesses and institutions in the unincorporated areas of Montgomery County and which will require management over the twenty year period covered by the plan.

# 3.4.2 Historical Solid Waste Quantities

Solid waste data for Montgomery County for calendar year 2002 is presented in Table 3-8. As indicated, it is estimated that almost 13,200 tons of municipal solid waste were generated in Montgomery County in 2002. Of this amount, about 1,100 tons were recycled and 12,100 tons were disposed, which resulted in an MSW recycling rate of 9%. An additional 192 tons were recycled – including 169 tons of tires and 22 tons of metal tire rims. Therefore the "Calculated Recycling Rate" which includes "Principal Recyclable Materials" from the MSW stream and "Supplemental Recyclable Materials" from MSW and other waste streams, was 9.8% in 2002.

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						te Streams						Special Wastes		
				Municipal Solid			Supplem.	Construct.	Regulated					
			Total	Publicly-Conf			Recycled	and Demol.						
Plan	Fiscal		MSW	MSW	MRF Mat. (3)			Wastes	Wastes	White Goods		Waste Oil	Batteries	Sludges
<u>'ear</u>	<u>Year</u>	<u>Population</u>	Tons/Yr	Tons/Yr	Tons/Yr	Tons/Yr	Tons/Yr	Tons/Yr	Tons/Yr	Tons/Yr	Tons/Yr	Tons/Yr	Tons/Yr	Tons/Yr
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
1	2004	17,514	11,439	8,347	4,427	1,373	671	10,883	137	224	288	45	128	185
2	2005	17,659	11,533	8,416	4,463	1,384	677	10,973	138	226	290	45	129	187
3	2006	17,805	11,629	8,486	4,500	1,395	682	11,064	140	227	292	45	130	188
4	2007	17,952	11,725	8,556	4,537	1,407	688	11,155	141	229	295	46	131	190
5	2008	18,100	11,822	8,626	4,575	1,419	694	11,247	142	231	297	46	132	192
6	2009	18,249	11,919	8,698	4,613	1,430	699	11,340	143	233	300	47	133	193
7	2010	18,400	12,018	8,769	4,651	1,442	705	11,434	144	235	302	47	134	195
8	2011	18,539	12,109	8,836	4,686	1,453	711	11,521	145	237	305	47	135	196
9	2012	18,679	12,200	8,902	4,721	1,464	716	11,608	146	239	307	48	136	198
10	2013	18,820	12,292	8,970	4,757	1,475	721	11,695	148	240	309	48	137	199
11	2014	18,963	12,385	9,038	4,793	1,486	727	11,784	149	242	311	48	138	201
12	2015	19,106	12,479	9,106	4,829	1,497	732	11,873	150	244	314	49	139	202
13	2016	19,250	12,573	9,175	4,866	1,509	738	11,962	151	246	316	49	141	204
14	2017	19,396	12,668	9,244	4,903	1,520	743	12,053	152	248	319	50	142	205
15	2018	19,542	12,764	9,314	4,940	1,532	749	12,144	153	250	321	50	143	207
16	2019	19,690	12,860	9,384	4,977	1,543	755	12,236	154	252	323	50	144	208
17	2020	19,839	12,957	9,455	5,015	1,555	760	12,328	155	253	326	51	145	210
18	2021	19,978	13,048	9,522	5,050	1,566	766	12,415	157	255	328	51	146	211
19	2022	20,119	13,140	9,588	5,085	1,577	771	12,502	158	257	330	51	147	213
20	2023	20,260	13,232	9,656	5,121	1,588	776	12,590	159	259	333	52	148	214
otes:														
1	Population	projections taken	from Table 2-	3.										
2	Future was	te quantities are	estimated by r	nultiplying the pr	ojected populatio	n by the "pe	r capita gene	ration rate" fo	r each waste	stream. The pe	r capita ge	neration rates	for each was	ste stream v
	assumed to	remain constant	over the 20 ye	ear planning peri	od, with tonnage	increases fo	or each wast	e stream atribi	uted to popula	ation growth.	_ · _ •			
3		2, the Town of Chi									73% of tl	ne MSW gene	rated in the t	own that ye
4		of Virginia estimat								· ·				
5	In its 2000	report, Franklin A	ssociates esti	mates that yard	waste comprised	1 12% of the	MSW stream	n.						
6		RMs were estimat												
7		A estimates that							ating to a per	capita generation	rate of 6.8	31 pounds per	person per	dav.
		&D generation ra						, - 1	,	, <b>j</b>				
8		medical waste is					sment to ran	ge from 0.3%-	2.0% of the N	MSW stream. A	value of 1.2	% was used t	or this Plan	
9		report, Franklin A												er day.
10		report, Franklin A												
11		report to the Stat												, -

# 3.4.3 Per Capita Generation Rates

As indicated in Table 3-8, residents and businesses in Montgomery County generated over 13,200 tons of municipal solid waste in 2002, which equates to a per capita generation rate of 2.69 pounds per person per day. In comparison, the US EPA reported a national MSW per capita generation rate of 4.4 pounds per person per day in 2001.

# 3.4.4 Waste Stream Projections

The per capita generation rates for the other waste streams and special waste categories – including white goods, tires, batteries, C&D wastes and regulated medical wastes – were based on national rates reported by the US EPA, as no local data were available to develop these rates.

ste Types	<u>Generated</u>	Recycled Tons	Percent	Disposed	Per Capita Generation Rate (Lbs/Person/D N	
Municipal Solid Waste PRMs	13,173.30	1,122.63	8.52%	12,050.67	2.69	1
Recyclable Ma White Goods <u>Yard Wastes</u> Subtotal	347.60 	827.33 288.95 6.35 1,122.63			0.07	
SRMs						_
Tires Tire Rims Waste Oil	445.95	169.46 22.27 -	38%		0.09	2
Batteries C&D Industrial Other	185.26	- - -	-		0.04	3
Subtotal		191.73			0.04	
Total		1,314.36				
C&D Wastes Regul. Medical Waste Mining Wastes Agricultural Wastes	33,422.66 131.73	-	0.0%		3.41 0.0322	4 5

- Data obtained from MRSWA scalehouse data for Montgomery County for calendar year 2002.
   2002 County Population estimated to be
   26,874 persons.
- 2. Waste generation rate for tires based on national generation rate reported in US EPA Franklin Report.
- 3. Waste generation rate for batteries based on national generation rate reported in US EPA Franklin Report.
- 4. C&D waste generation rate based on US EPA estimate of 350,000,000 tons of C&D waste generated annually and U.S. population of 281.4 million persons, which equates to 6.81 pounds per person per day. (See US EPA "Waste Generation in the U.S. (Presentation made to SWANA Senior Executive Seminar, Jan. 17, 2004) The regional C&D generation rate was assumed to be 50% of the National rate.
- 5. Regulated medical waste assumed to equal 1.2% of msw generation rate.

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The per capita generation rates presented in Table 3-8 were used to estimate future waste quantities for each of the waste streams and special waste substreams for which projections are required by VDEQ.

To estimate future waste quantities, the per capita generation rates were assumed to remain constant over the 20-year period covered by the plan. The per capital generation rates, as presented in Table 3-8, are multiplied by the future population estimates presented in Table 2-3, to estimate future waste quantities. These are presented in Table 3-9 for the years 2004-2023 for Montgomery County.

# 3.5 Virginia Tech

#### 3.5.1 Introduction

The purpose of this section is to present estimates of the quantities and types of solid waste streams, and special waste substreams, that will be generated by the faculty, students and employees of Virginia Tech and which will require management over the twenty year period covered by the plan.

# 3.5.2 Historical Waste Quantities

Solid waste data for Virginia Tech for calendar year 2002 is presented in Table 3-10. As indicated, Virginia Tech reported that over 6,500 tons of municipal solid waste were generated by the University in 2002. Of this amount, about 1,300 tons were recycled and 5,200 tons were disposed, which resulted in an MSW recycling rate of 20%.

An additional 61 tons were recycled from other waste streams – including 23 tons of C&D waste and 33 tons of other waste. Therefore the "Calculated Recycling Rate" which includes "Principal Recyclable Materials" from the MSW stream and "Supplemental Recyclable Materials" from other waste streams, was 21.3% in 2002.

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				Table 3-9. MO	ONTGOMERY	COUNTY,	Virginia -	WASTE ST	REAM PROJ	IECTIONS				
					Was	te Streams					Sn	ecial Waste	_	
						te Streams		Complement	De sudate d		Spe	eciai waste	:5	
				Municipal Solid			Supplem.	Construct.	Regulated					
DI	F:1		Total	Publicly-Conf			Recycled	and Demol.	Medical	\MIL:4- 0I-	<b>T</b>	W4- 0:1	D-44i	01
Plan	Fiscal	DI - 4:	MSW	MSW	RPF Mat. (3)	Yd Waste	_	Wastes	Wastes	White Goods		Waste Oil	Batteries	Sludges
<u>Year</u>	<u>Year</u>	Population	Tons/Yr	Tons/Yr	Tons/Yr	Tons/Yr	Tons/Yr	Tons/Yr	Tons/Yr	Tons/Yr	Tons/Yr	Tons/Yr	Tons/Yr	Tons/Yr
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
1	2004	26,612	13,045	13.045	5.048	1.565	190	16.537	157	340	437	68	194	282
2	2004	26,470	12,975	12,975	5,048	1,565	189	16,537	157	338	437	68	194	282
3	2005	26,470	12,975	12,975	4,993	1,557	188	16,449	155	336	435	67	193	279
4	2007	26,321	12,902	12,902	4,993	1,546	187	16,356	155	334	432	67	192	279
5	2007		12,826	12,745	4,984	1,539	185	16,259	154	332	430	66	190	275
6	2008	26,001 25,829	12,745	12,745	4,932	1,529	185	16,051	153	330	427	66	189	273
7	2010	25,650	12,573	12,573	4,866	1,519	183	15,939	152	328	424	66	187	272
8	2010	25,912	12,702	12,702	4,916	1,509	185	16,102	152	331	426	66	189	274
9	2011	26,176	12,702	12,702	4,966	1,524	187	16,162	154	334	430	67	191	277
10	2012	26,443	12,962	12,962	5,016	1,555	189	16,432	156	338	434	68	193	280
11	2013	26,713	13,094	13,094	5,067	1,571	191	16,600	157	341	439	68	195	283
12	2015	26,984	13,227	13,227	5,119	1,587	193	16,768	159	345	443	69	197	286
13	2016	27,259	13,362	13.362	5,171	1,603	194	16,939	160	348	448	70	199	289
14	2017	27,535	13,498	13,498	5,224	1,620	196	17,111	162	352	452	70	201	291
15	2018	27,815	13,635	13.635	5.277	1,636	198	17,284	164	355	457	71	203	294
16	2019	28.097	13,773	13,773	5,330	1,653	200	17,460	165	359	461	72	205	297
17	2020	28,381	13,912	13,912	5.384	1,669	202	17,636	167	363	466	73	207	300
18	2021	28,635	14,037	14.037	5,432	1,684	204	17,794	168	366	470	73	209	303
19	2022	28,892	14,163	14,163	5,481	1,700	206	17,954	170	369	475	74	211	306
20	2023	29,151	14,289	14,289	5,530	1,715	208	18,115	171	372	479	74	213	309
		20,101	,	,	5,000	.,		10,110		0.2				
Notes:														
1	Population	projections taken	from Table 2-	3.										
2	Future was	te quantities are	estimated by n	nultiplying the pr	oiected populatio	n by the "per	capita genera	ation rate" for e	ach waste str	eam. The per c	apita gener	ation rates for	each waste	stream we
		remain constant												
3	In CY 2002	. Montgomery C	ounty brought	12,050.67 tons	of MSW and 1,	116.28 tons	of recyclables	to the MRSW	A facility. This	represented 100	% of the M	SW generate	d by the Cour	nty that ye
4	The State of	of Virginia estimat	es that 38.7%	of the MSW str	eam is recyclable	e (excluding y	ard waste, w	hich is composi	table.)	T				
5		report, Franklin A												
6		RMs were estimat												
7		A estimates that							ng to a per car	oita generation ra	ate of 6.81	pounds per pe	erson per day	
		al C&D generation												
8		medical waste is					ment to range	e from 0.3%-2.	0% of the MS\	N stream. A valu	ue of 1.2%	was used for	this Plan.	
9		report, Franklin A												day.
10		report, Franklin A												
11		report to the Stat												
12		report, Franklin A											nds per perso	n per dav.
13		report to the Stat												

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		Recy	cled		Per Capita Generation Rate	
iste Types	<u>Generated</u>	Tons	<u>Percent</u>	Disposed	(Lbs/Person/Day)	Note
Municipal Solid Waste PRMs	6,519.87	1,324.70	20%	5,195.17	4.00	1
Recyclable Matls.		817.20				
White Goods	115.39	-			0.07	
Yard Wastes	782.38	507.50				
Subtotal	·	1,324.70				
SRMs						
Tires	148.04	0.92	-	-	0.09	2
Waste Oil	-	2.61	-	-		
Batteries	61.50	1.00	-	-	0.04	3
C&D	-	23.43	-	-		
Industrial	-	-	-	-		
Other	-	33.16	-	-		
Subtotal		61.12				
Total		1,385.82				
C&D Wastes	11,094.91	23.43	0.2%		3.41	4
Regul. Medical Waste	65.20				0.0400	
Industrial Wastes	6,945.54				4.27	6
Agricultural Wastes						
Calculated Recycling Rate		21.3%				

- Data obtained from Virginia Tech's Commonwealth of Virginia Locality Recycling Report For Calendar Year 2002.
   2002 on-campus student population estimated to be 8,921 persons.
- Waste generation rate for tires based on national generation rate reported in US EPA Franklin Report.
- Waste generation rate for batteries based on national generation rate reported in US EPA Franklin Report.
   C&D waste generation rate based on US EPA estimate of 350,000,000 tons of C&D waste generated annually and
- 4. C&D waste generation rate based on US EPA estimate or 350,000,000 tons of C&D waste generated annually and U.S. population of 281.4 million persons, which equates to 6.81 pounds per person per day. (See US EPA "Waste Generation in the U.S. (Presentation made to SWANA Senior Executive Seminar, Jan. 17, 2004) The regional C&D generation rate was assumed to be 50% of the National rate.
- 5. Regulated medical waste assumed to equal 1% of msw generation rate.
- 6. In FY2003, Virginia Tech reported that 6,945.54 tons of ash were produced by the University Power Plant.

In addition to the MSW and supplementary recyclable materials reported in its Locality Recycling Report, Virginia Tech also generates ash from the combustion of coal in its heating plant. In calendar year 2003, a total of 6,946 tons of coal ash were generated. Currently, this ash is being used as an alternative daily cover at the Regional Landfill of the New River Resource Authority.

## 3.5.3 Per Capita Generation Rates

As indicated in Table 3-10, the students, faculty and employees of Virginia Tech generated over 6,500 tons of municipal solid waste in 2002, which equates to a per capita generation rate of 4.00 pounds per on-campus student per day. In comparison, the US EPA reported a national MSW per capita generation rate of 4.4 pounds per person per day in 2001.

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# 3.5.4 Waste Stream Projections

The per capita generation rates for the other waste streams and special waste categories – including white goods, tires, batteries, C&D wastes and regulated medical wastes – were based on national rates reported by the US EPA, as no local data were available to develop these rates.

The per capita generation rates presented in Table 3-10 were used to estimate future waste quantities for each of the waste streams and special waste substreams for which projections are required by VDEQ.

To estimate future waste quantities, the per capita generation rates were assumed to remain constant over the 20-year period covered by the plan. The per capital generation rates, as presented in Table 3-10, are multiplied by the future population estimates presented in Table 2-3, to estimate future waste quantities. These are presented in Table 3-11 for the years 2004-2023 for Virginia Tech.

## 3.6 Summary

## 3.6.1 Introduction

The purpose of this section is to summarize the estimates of the quantities and types of solid waste streams and special waste substreams that will be generated in the Montgomery County planning region over the twenty year period covered by the plan.

## 3.6.2 Historical Waste Quantities

Solid waste data for the Montgomery County planning region for calendar year 2002 is presented in Table 3-12.<sup>1</sup> As indicated, over 78,700 tons of municipal solid waste were generated in the Montgomery County planning region in 2002. Of this amount, about 21,600 tons were recycled and 57,100 tons were disposed, which resulted in an MSW recycling rate of 27%.

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<sup>&</sup>lt;sup>1</sup> The waste data for the region is based on the <u>Locality Recycling Rate Report for Calendar Year 2002</u> prepared by the MRSWA. It should be noted that this report includes waste and recyclables tonnages that are not included in the Locality Recycling Reports developed for Montgomery County, the towns of Blacksburg and Christiansburg, and Virginia Tech. Therefore the waste and recyclables tonnages presented in this section are higher than the sums of the waste and recyclables tonnages for the three jurisdictions and Virginia Tech, as presented in the previous tables.

					Table 3-11.										
					Wast	e Streams						Spe	cial Waste	es	
				Municipal Solid			Supplem.	Construct.	Regulated						
			Total	Publicly-Cont		/c Matl	Recycled	and Demol.	Medical	Industrial					
Plan	Fiscal		MSW	MSW	MRF Mat. (3)			Wastes	Wastes	Wastes	White Good	ls Tires	Waste Oil	Batteries	Sludge
Year	Year	Population	Tons/Yr	Tons/Yr	Tons/Yr	Tons/Yr	Tons/Yr	Tons/Yr	Tons/Yr	Tons/Yr	Tons/Yr	Tons/Yr	Tons/Yr	Tons/Yr	Tons/Y
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
		,													
1	2004	8,921	6,520	6,005	2,523	782	4,249	5,544	78	6,946	114	147	23	65	(
2	2005	8,921	6,520	6,005	2,523	782	4,249	5,544	78	6,946	114	147	23	65	(
3	2006	8,921	6,520	6,005	2,523	782	4,249	5,544	78	6,946	114	147	23	65	9
4	2007	8,921	6,520	6,005	2,523	782	4,249	5,544	78	6,946	114	147	23	65	9
5	2008	8,921	6,520	6,005	2,523	782	4,249	5,544	78	6,946	114	147	23	65	9
6	2009	8,921	6,520	6,005	2,523	782	4,249	5,544	78	6,946	114	147	23	65	(
7	2010	8,921	6,520	6,005	2,523	782	4,249	5,544	78	6,946	114	147	23	65	,
8	2011	8,921	6,520	6,005	2,523	782	4,249	5,544	78	6,946	114	147	23	65	!
9	2012	8,921	6,520	6,005	2,523	782	4,249	5,544	78	6,946	114	147	23	65	(
10	2013	8,921	6,520	6,005	2,523	782	4,249	5,544	78	6,946	114	147	23	65	(
11	2014	8,921	6,520	6,005	2,523	782	4,249	5,544	78	6,946	114	147	23	65	(
12	2015	8,921	6,520	6,005	2,523	782	4,249	5,544	78	6,946	114	147	23	65	(
13	2016	8,921	6,520	6,005	2,523	782	4,249	5,544	78	6,946	114	147	23	65	9
14	2017	8,921	6,520	6,005	2,523	782	4,249	5,544	78	6,946	114	147	23	65	9
15	2018	8,921	6,520	6,005	2,523	782	4,249	5,544	78	6,946	114	147	23	65	9
16	2019	8,921	6,520	6,005	2,523	782	4,249	5,544	78	6,946	114	147	23	65	9
17	2020	8,921	6,520	6,005	2,523	782	4,249	5,544	78	6,946	114	147	23	65	9
18	2021	8,921	6,520	6,005	2,523	782	4,249	5,544	78	6,946	114	147	23	65	9
19	2022	8,921	6,520	6,005	2,523	782	4,249	5,544	78	6,946	114	147	23	65	9
20	2023	8,921	6,520	6,005	2,523	782	4,249	5,544	78	6,946	114	147	23	65	9
N-4															
Notes:															
1	Danulation	nyaiaatiana takan	from Toble 2	2 The Viveinia T	aab manulatian r	-f t	ununun niuda	nt manulation a	mls r						
2		projections taken te quantities are								stroom Th	o por capita d	noration rates	for each was	to stroom w	oro
		to remain constan										elleration rates	ioi eacii was	ie stream we	516
3		. Virginia Tech bi										erated by the LI	niversity that	Vear	
4		of Virginia rectima					S to the MIX	OVA lacility. 1	ilis represent	.eu 92.170 UI	the Movi gen	erated by the O	iliversity tilat	year.	
5		report, Franklin A					MSW stream	m							
6		RMs were estima													
7		'A estimates that							ting to a per	canita dener	ation rate of 6	81 nounds per	nerson ner d	lav	
- '		&D generation ra	, , , , , , , , , , , , , , , , , , , ,				Joneraleu III	anc o.o., equa	ung to a per	Japita genel	anon rate of 0	.c. pourus per	person per u	uy.	
8		medical waste is					ment to ran	ge from 0.3%-	0% of the N	/ISW stream	A value of 1	2% was used for	or this Plan		
9		year 2003, a tot							2.0 70 01 110 1	Stream	7. 70100 01 1.		o. ano i idil.		
10		report, Franklin A							quating to a	ner capita de	neration rate o	of 0.07 pounds r	ner nerson ne	er dav	
11		report, Franklin A													
12		report to the Sta												. aay.	
13		report, Franklin A												rson per day	
14		report to the Sta													

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					Per Capita	
		Recyc			Generation Rate	
ste Types	<u>Generated</u>	<u>Tons</u>	<u>Percent</u>	<u>Disposed</u>	(Lbs/Person/Day)	Notes
Municipal Solid Waste	78,722.22	21,601.14	27%	57,121.08	5.07	1
PRMs		-				
Recyclable Matls.		17,926.40				
Yard Waste		3,407.17				
Waste Wood		267.57				
Subtotal		21,601.14				
SRMs						
Recycled						
Tires	1,411	1,328.81	94%		0.09	2
Used Oil		219.98				
Used Oil Filters		2.74				
Antifreeze		25.53				
Abandoned Autos		6.00				
Batteries	586	87.40	15%		0.04	
Electronics		0.83				
<u>Other</u>		1,198.30				
Subtotal		2,869.59				
Reused		_,				
Construction Waste		1,120.04				
Demolition Waste		100.00				
Other		2,427.71				
Subtotal		3,647.75				
Total - SRMs Recyc	led or Reused	6,517.34			0.42	
C&D Wastes	52,867	1,267.47	2.4%		3.41	4
Regul. Medical Waste	945	.,=0			0.0609	į
Industrial Wastes	9,037.83	2,092.29	23%		0.58	é
Sludges	-	1,133.29	== 70		0.07	Ì
-						

- Data compiled from the <u>Locality Recycling Report For Calendar Year 2002</u> developed by the MRSWA.
   2002 County population estimated to be
   85,016 persons.
- 2. Waste generation rate for tires based on national generation rate reported in US EPA Franklin Report.
- 3. Waste generation rate for batteries based on national generation rate reported in US EPA Franklin Report.
- 4. C&D waste generation rate based on US EPA estimate of 350,000,000 tons of C&D waste generated annually and U.S. population of 281.4 million persons, which equates to 6.81 pounds per person per day. (See US EPA "Waste Generation in the U.S. (Presentation made to SWANA Senior Executive Seminar, Jan. 17, 2004) Regional generation rate assumed to be 50% of National rate.
- 5. Regulated medical waste assumed to equal 1.2% of msw generation rate.
- 6. Industrial wastes include 6,945.54 tons of ash from the Virginia Tech power plant and 2,092.29 tons of fired cullet and dust used as alternative daily cover at the NRRA Regional Landfill.

An additional 6,500 tons were recycled from other waste streams – including 1,200 tons of C&D waste and 2,100 tons of industrial waste. Therefore the "Calculated Recycling Rate" which includes "Principal Recyclable Materials" from the MSW stream and "Supplemental Recyclable Materials" from other waste streams, was 33.0% in 2002 for the region.

## 3.6.3 Per Capita Generation Rates

As indicated in Table 3-12, the residents, business and institutions generated 78,722 tons of municipal solid waste in 2002, which equates to a per capita generation rate of 5.07 pounds per

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person per day. In comparison, the US EPA reported a national MSW per capita generation rate of 4.4 pounds per person per day in 2001.

In 1998, the MRSWA reported that a total of 74,733 tons of MSW were delivered to the MRSWA transfer station for disposal. In comparison, a total of 57,100 tons of MSW were delivered to the MRSWA transfer station for disposal in 2002. From this comparison, it appears that over 17,000 tons of MSW are being taken to non-MRSWA disposal facilities on an annual basis.

In the <u>1991 Solid Waste Management Plan</u><sup>1</sup>, an MSW generation rate of 141 tons per day was reported. Using the County's 1990 population of 73,913, this equates to a per capita generation rate of 3.8 pounds per person per day.<sup>2</sup>

# 3.6.4 Waste Stream Projections

The per capita generation rates for the other waste streams and special waste categories – including white goods, tires, batteries, C&D wastes and regulated medical wastes – were based on national rates reported by the US EPA, as no local data were available to develop these rates.

The per capita generation rates presented in Table 3-12 were used to estimate future waste quantities for each of the waste streams and special waste substreams for which projections are required by VDEQ.

To estimate future waste quantities, the per capita generation rates were assumed to remain constant over the 20-year period covered by the plan. The per capital generation rates, as presented in Table 3-12, are multiplied by the future population estimates presented in Table 2-3, to estimate future waste quantities. These are presented in Table 3-13 for the years 2004-2023 for the Montgomery County planning region.

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<sup>&</sup>lt;sup>1</sup> Town of Blacksburg, Town of Christiansburg, County of Montgomery. <u>Solid Waste Management Plan</u>. May 10, 1991 (Reprinted May, 1992).

<sup>&</sup>lt;sup>2</sup> The U.S. EPA reported that the national per capita MSW generation rate in 1990 was 4.5 pounds per person per day.

											EAM PROJEC				
						Waste St	Barren					0	ecial Waste	<u> </u>	
					LIAL-A- IRACIA					Regulated		- Spe	eciai vvaste	18	
			Total	unicipal Solid Publicly-Cont			Supplem. Recycled	Construct.	Industrial	Medical			_		
Plan	Fiscal		MSW	MSW	MRF Mat. (3)			Wastes	Wastes	Wastes	White Goods	Tiror	Waste Oil	Batteries	Sludges
rear	Year	Population	Tons/Yr	Tons/Yr	Tons/Yr	Tons/Yr	Tons/Yr	Tons/Yr	Tons/Yr	Tons/Yr	Tons/Yr	Tons/Yr	Tons/Yr	Tons/Yr	Tons/Yr
Cai	<u>rear</u>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
		(1)	(2)	(3)	(4)	(3)	(0)	(1)	(0)	(3)	(10)	(11)	(12)	(13)	(1-)
1	2004	86,427	79,969	31,143	30,948	9,596	6.625	53,707	9,188	960	1,104	1,420	221	631	1,104
2	2005	87,141	80,629	31,306	31,203	9,676	6,679	54,150	9,264	968	1,113	1,431	223	636	1,113
3	2006	87,861	81,295	31,469	31,461	9,755	6,735	54,598	9,340	976	1,122	1,443	224	641	1,122
4	2007	88,586	81,967	31,631	31,721	9,836	6,790	55,049	9,417	984	1,132	1,455	226	647	1,132
5	2008	89,318	82,644	31,793	31,983	9,917	6,846	55,503	9,495	992	1,141	1,467	228	652	1,141
6	2009	90,056	83,327	31,955	32,247	9,999	6,903	55,962	9,574	1,000	1,150	1,479	230	657	1,150
7	2010	90,800	84,015	32,116	32,514	10,082	6,960	56,424	9,653	1,008	1,160	1,491	232	663	1,160
8	2011	91,486	84,650	32,380	32,760	10,158	7,012	56,851	9,726	1,016	1,169	1,503	234	668	1,169
9	2012	92,178	85,290	32,645	33,007	10,235	7,065	57,280	9,799	1,023	1,178	1,514	236	673	1,178
10	2013	92,874	85,934	32,913	33,257	10,312	7,119	57,713	9,873	1,031	1,186	1,525	237	678	1,186
11	2014	93,576	86,584	33,183	33,508	10,390	7,173	58,149	9,948	1,039	1,195	1,537	239	683	1,195
12	2015	94,283	87,238	33,455	33,761	10,469	7,227	58,589	10,023	1,047	1,204	1,549	241	688	1,204
13	2016	94,996	87,897	33,729	34,016	10,548	7,281	59,032	10,099	1,055	1,214	1,560	243	693	1,214
14	2017	95,714	88,561	34,005	34,273	10,627	7,336	59,478	10,175	1,063	1,223	1,572	245	699	1,223
15	2018	96,437	89,231	34,284	34,532	10,708	7,392	59,927	10,252	1,071	1,232	1,584	246	704	1,232
16	2019	97,166	89,905	34,565	34,793	10,789	7,448	60,380	10,329	1,079	1,241	1,596	248	709	1,241
17	2020	97,900	90,584	34,848	35,056	10,870	7,504	60,836	10,407	1,087	1,251	1,608	250	715	1,251
18	2021	98,588	91,221	35,110	35,302	10,947	7,557	61,264	10,481	1,095	1,259	1,619	252	720	1,259
19	2022	99,281	91,862	35,374	35,551	11,023	7,610	61,694	10,554	1,102	1,268	1,631	254	725	1,268
20	2023	99,978	92,507	35,640	35,800	11,101	7,663	62,128	10,628	1,110	1,277	1,642	255	730	1,277
otals	-		1,725,309	663.543	667,695	207.037	142.925	1,158,713	198.225	20,704	23.821	30.627	4.764	13.612	23,821
Utais	-		1,725,505	003,343	007,000	201,031	142,525	1,130,713	150,225	20,704	23,021	30,021	4,704	13,012	23,021
lotes:															
101001												4			
1	Population	projections taker	from Table 2-	3.											
2	Future was	ste quantities are	estimated by n	nultiplying the pro	jected populatio	n by the "per	capita gener	ation rate" for e	each waste str	eam and subst	ream. The MSW	per capita	generation ra	te for the pla	nning
	region is b	ased on the MRS	WA MSW tonn	age of 78,722.2	2 as reported in	Table 3-12 w	hich equates	to a per capita	generation ra	te of 5.07 pour	ds per person p	er day.			-
3	Publicly co	introlled wastes re	epresent sums	of publicly-contro	olled waste in ea	ch jurisdiction	as reported	in Tables 3-5,	3-7, 3-9 and 3	-11.					
4		of Virginia estima							table.)						
5		report, Franklin A													
6		jctions based on p													
8		PA estimates that				astes were g	generated in t	the U.S., equati	ng to a per ca	pita generation	rate of 6.81 pour	unds per pe	rson per day.		
		generation rate o													
8		ustrial wastes include			Tech heating plant	and 2,092.29 to	ons of firet cullet	t and dust used as	alternative daily	cover at the NRRA	Regional Landfill.				
		to a per capita gene					1					l			
9		medical waste is													
10		report, Franklin A													
11		report, Franklin A												ıy.	
12		report to the Sta													
13		report, Franklin A												per day.	
14	In ite 2002	report to the Sta	to the MRSIM	A reported that 1	133 70 tone of e	ludges were	recycled or	reused equation	00 to a nor car	nite congration	rate of 0.07 nou	Inde por por	COR BOT ASU		

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## **SECTION 4.0**

## **EXISTING SOLID WASTE MANAGEMENT SYSTEMS**

## 4.1 Introduction

As indicated in Section 3.0, approximately 142,000 tons of solid waste are generated each year within the Montgomery County planning region.

The purpose of this chapter is to present information regarding the services and facilities that are utilized to collect and manage these wastes. These services are provided by both the public and private sectors, with the latter mainly responsible for providing collection and disposal services to commercial and industrial customers.

# 4.2 Town of Blacksburg

#### 4.2.1 Introduction

The Town of Blacksburg created a Waste Management fund in 1993. The Waste Management Fund is an enterprise fund, in which the money is used solely for the purpose of waste management. Citizens pay the Town for refuse and recycling services through a utility fee, which is charged on a monthly basis. The Fund monies are used to pay the Town's contractors as well as to cover in-house costs. The Town utilizes a competitive multi-year contract to secure a contractor to conduct refuse and recycling services. Refuse is collected weekly, according to a quadrant system by automated side-loading trucks. In the case of the elderly or disabled customers, service is provided at the customers backdoor using a manually operated truck, this service is provided at no additional charge. Recycling is collected curbside in bins provided by the Town, by semi-automated dual compartment trucks.

The Town has implemented an Environmental Management System, which contains a section that directly addresses its intent to reduce the amount of material sent to the landfill as waste. There is also a section that addresses the need to purchase more recyclable or recycled products. The Town has assembled an internal group, which meets periodically in order to discuss waste reduction and recycling goals and to find ways to achieve them.

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The Town has formed a work group aimed at finding a solution to the growing need to establish an e-cycling program, both for internal use, and as a service to its citizens. The Town does a substantial amount of public education about recycling, utilizing various media such as brochures, the Town website, Town publications, public access television, and e-news. The Town is assisting interested Blacksburg schools in developing recycling programs, and has thus far helped one school develop a comprehensive recycling program, and with the assistance of its current refuse and recycling contractor, has provided others with the means to recycle commingled containers and newspaper. The Town collects residential recyclables through the provision of a curbside recycling service, which is supplemented by Town recycling drop off centers. These services provide Blacksburg citizens with the opportunity to recycle five primary recyclable items.

The Town has established an internal recycling program that provides the opportunity for all Town staff to recycle primary materials in its facilities. In addition, the Town is recycling rechargeable batteries, and toner cartridges. Scrap metals generated in Town operations are collected at the Public Works lot and recycled. White goods, tires, brush, and leaves collected in Town operations are also recycled. The Town collects holiday cards that are sent to St. Jude's Ranch for Children and recycled each year during and after the holidays. The Town also participates in and supports the regional phone book recycling program which is sponsored by MRSWA and is conducted on an annual basis.

The Town participates in several programs that are aimed at waste reduction, and that encourage recycling, on its own and regionally, including a Hazardous Household Waste and Latex Paint Exchange Day. The Town also participates in "Broomin' and Bloomin'", which is a regional event sponsored by the Montgomery County Improvement Council that organizes volunteers for a county wide clean up day. The Town supports "The Big Event" which is an annual clean up event sponsored by Virginia Tech. Many of Blacksburg's streets are patrolled for litter during this event and the Town provides cleanup materials and litter routes for volunteers to use and follow. The Town maintains an "Adopt A Park" program, which gives citizens an opportunity to volunteer in their community, and provides litter pickup projects for interested people or groups.

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The Town is committed to enhancing both its residential and facilities recycling programs in the future, and in both cases education will remain a focal point. In its facilities, the Town wishes to better address the "Universal Waste" being generated. Currently, Public Works is in the process of obtaining a storage building to be used to house universal wastes such as fluorescent light tubes and ballasts, toner cartridges, rechargeable and non-rechargeable batteries, and other items that will be identified that could be better managed, and recycled or properly disposed of.

The Town's Community Recycling Program is routinely able to meet and surpass the State mandated recycling rate of 25%, and Town staff spends numerous hours collecting information from residential routes, businesses, apartments, and industry towards this goal. The Town's refuse and recycling department offers its support and assistance to businesses who wish to start up recycling or waste reduction programs. Town staff continues to work with apartment residents, managers, and owners to ensure that apartment dwellers have the proper recycling opportunities at apartment complexes per the Town code. The Town also wishes to explore new programs, such as composting as a regional program, and may at some time in the future be able to pursue this or other re-use or waste reduction programs.

## 4.2.2 Municipal Solid Waste Management Services

## 4.2.2.1 MSW Collection

The Town of Blacksburg provides a total of 6 collection services to 5,216 dwelling units and small businesses. These services are summarized in Table 4-1.

Single-family households are estimated to comprise approximately 45% of the Town's population when student population numbers are included. Collection services to dwelling units and small businesses are provided under contract with a private service provider.

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Table 4-1. Solid Waste Collection Services Provided by the Town of Blacksburg, Virginia

Service	Description	Service Provider	Collection Method	Frequency
Refuse	Curbside collection of refuse in	Contractor	Automated	Weekly
Collection-	96 gallon containers provided	(Competitive multi-	collection	
Curbside Customers	by the Town	year contract)	vehicles	
Refuse	Backdoor collection of refuse	Contractor	Semi-automated	Weekly
Collection –	and recyclables for elderly or	(Competitive multi-	collection	
Backdoor	disabled individuals	year contract)	vehicles	
Customers				
Recyclables	Curbside collection of	Contractor	Side-loading,	Weekly
Collection	commingled containers and	(Competitive multi-	dual-	
	newspapers in curbside	year contract)	compartment vehicles	
	recycling bins provided by the Town		venicles	
Brush	Curbside collection of brush	Town	Backhoe/Dump	Monthly
Collection	(up to 7' long and 6" in diameter)		Truck	
Fall Leaf	Curbside collection of piled and	Town	Vacuum	Fall
Pickup	bagged leaves		machines and	
			dump trucks	
Bulky Waste	Curbside collection of bulky	Town	Backhoe/Dump	2X/Year
Collection	waste, including furniture, tires, appliances, carpet etc.		Truck	(Spring and Fall)
Christmas	Curbside collection of	Town	Backhoe/Dump	1X/Year
Tree	Christmas trees		Truck	(Winter)
Collection				

The Town contracts for the curbside weekly collection of refuse and recyclables from the Town's 5,216 single-family residences. Both refuse and recyclables are collected on the same day from each residence. Residents are provided with 96 gallon roll-out containers by the Town to set out refuse for collection and 14-gallon recycling bins, also provided by the Town, to set out recyclables.

Residents are charged \$15.88 per residence per month for the weekly collection of refuse and recyclables, the monthly collection of brush, fall leaf pickup, Christmas

Tree pickup and twice-per-year bulky waste collection. These charges include tipping fee

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charges at the MRSWA Transfer Station. The Town pays for WM's contract cost and its own service costs with these monies.

Currently, commercial, industrial, and multi-family apartment complexes privately contract for their own refuse collection services. Approximately 62% of the housing units in the Town consist of multi-family units which are highly populated by students. The major haulers providing commercial and multi-family refuse collection services are Browning Ferris Industries (BFI), Waste Management, Inc. (WM), and Bob's Refuse, Inc.

The wastes and recyclables collected from single-family residences are brought to the MRSWA transfer station and/or recyclables processing facility. Commercial haulers are not required to use the MRSWA facilities and it is believed that at least a portion of the wastes collected by commercial haulers is transported to out-of-county facilities for disposal.

# 4.2.2.2 MSW Recycling and Waste Reduction

The Town of Blacksburg facilitates waste reduction and recycling by encouraging citizens to recycle and by setting an example through its recycling program established for Town buildings. Grinding brush and Christmas trees for combustion as a fuel in a waste-to-energy facility also reduces the flow of waste to the landfill. Live Christmas trees are often collected to plant in the Town's parks.

In 1992, the Town initiated a curbside recycling program collecting containers, mixed paper, and newspaper for refuse customers. Currently, the program continues collecting newspaper and also collects commingled containers. Corrugated cardboard, white paper, and magazines are collected at drop-off centers operated by the Town, and residents can utilize County drop-off sites.

In 1992, Blacksburg also adopted the Apartment Recycling Ordinance, which mandates that apartment managers must provide recycling collection facilities for the

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same five products that the Town includes in its recycling program for tenants.

Currently, the managers can choose whatever means they desire. Historically, this ordinance has been difficult to enforce but plans are forthcoming to make the ordinance more effective.

## 4.2.2.3 Special Waste Services

## 4.2.2.3.1 Household Hazardous Waste

Every year Blacksburg participates in an annual "Household Hazardous Waste Day" – conducted in coordination with the Town of Christiansburg and Montgomery County - to collect household hazardous materials that can be recycled. Currently, items collected include batteries, antifreeze, paint and solvents. This limits the amount of hazardous waste that makes it to the landfill, allows citizens to easily remove dangerous materials from the household, and promotes recycling. Along the same line, the Town encourages citizens to participate in the County's annual Paint Exchange day.

The Town also conducts an annual "electronics auction" for electronic equipment that is no longer used by the Town. A similar annual auction is conducted for the Town's furniture that is no longer used by the Town.

# 4.3 Town of Christiansburg

## 4.3.1 Introduction

The Town of Christiansburg provides curbside collection for single-family residences and businesses using in-house collection crews and equipment. Most commercial businesses and apartment complexes privately contract out for their waste removal. The solid waste and recycling services provided by the Town are funded, for the most part, by the users of these services.

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# 4.3.2 Municipal Solid Waste Management Services

## 4.3.2.1 MSW Collection

The town of Christiansburg provides a total of 5 collection services to 4,750 of the Town's 8,000 single-family residences. These services, which residents can sign up to receive and pay for on a voluntary basis, are summarized in Table 4-2.

Table 4-2. Solid Waste Collection Services Provided by the Town of Christiansburg, Virginia				
Service	Description	Service Provider	Collection Method	Frequency
Residential Refuse Collection	Curbside collection of refuse in containers provided by residents	Town	Manual Collection Vehicles	Weekly
Residential Leaves Collection	Curbside collection of leaves	Town	Backhoe/Dump Truck	2X/Year (Spring and Fall)
Residential Brush and Bulky Waste Collection	Curbside collection of bulky waste, including furniture, tires, appliances, carpet etc.	Town	Backhoe/Dump Truck	2X/Year (Spring and Fall)
Residential Christmas Tree Collection	Curbside collection of Christmas trees	Town	Backhoe/Dump Truck	1X/Year (Winter)
Commercial Refuse Collection	Curbside collection of refuse in containers provided by businesses	Town	Manual Collection Vehicles	Daily-Weekly

The Town provides these services with its own collection crews and equipment. Specifically, the Town uses rear-loading packer trucks staffed by 3-person crews. The Town employs the "manual" collection approach in which the collectors manually lift the containers and empty them into the collection vehicle.

In addition to weekly refuse collection, the Town provides the following periodic collection services to single family residences:

- Curbside collection of brush and bulky wastes twice per year
- Curbside collection of leaves twice per year
- Curbside collection of Christmas trees once per year.

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Residents who sign up to receive residential solid waste collection services are charged \$12.50 per household per month.

The Town also provides regular collection services to 92 businesses located in the Town. Collection frequency varies from weekly to daily depending on the business.

Commercial customers are charged \$4.70 per cubic yard per "pull" for dumpster service. Total program revenues from all customers were reported to be \$867,928 in fiscal year 2002-2003 while program costs for all services were reported to be \$885,013. It should be noted that program costs do not include amortized capital costs for refuse collection equipment or containers. The MRSWA reported that 7,341 tons of MSW were received from the Town of Christiansburg in calendar year 2002. In light of this tonnage, the costs of the Town's solid waste services are on the order of \$121 per ton.

Single-family residences, multi-family apartment complexes, businesses and industries not served by Town crews can privately contract for their own refuse collection services. The major haulers providing single-family, multi-family and commercial refuse collection services are Browning Ferris Industries (BFI) and Waste Management, Inc. (WM).

The wastes collected by the Town from single-family residences and businesses are brought to the MRSWA transfer station and/or recyclables processing facility.

Commercial haulers are not required to use the MRSWA facilities and it is believed that at least a portion of the wastes collected by commercial haulers is transported to out-of-county facilities for disposal.

## 4.3.2.2 MSW Recycling and Waste Reduction

The Town of Christiansburg provides three unattended drop-off sites for recycling. In addition, there is a drop-off location for corrugated cardboard located at the

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<sup>&</sup>lt;sup>1</sup> A "pull" refers to the emptying of the refuse container contents into the collection vehicle.

Parks and Recreation Department. Residents can also utilize the County's consolidated collection sites to drop off their recyclables.

The Town also runs a live Christmas tree donation program. In addition, the Town collects brush twice a year from Town residents, which is then ground into mulch along with Christmas trees. Leaves are also collected.

The Town of Christiansburg encourages its citizens to take advantage of the Goodwill, Salvation Army, Red Cross, etc. to facilitate reuse of materials. These organizations collect donated material such as furniture, cloths, and other items and sell them to the public. Another way Christiansburg facilitates reuse is through surplus auctions.

Finally, Town residents can use the County's consolidated collection sites to drop off their recyclables.

## 4.3.2.3 Special Waste Management Services

The Town encourages citizens to participate in the County's Paint Exchange day and the household hazardous waste collection events sponsored by Montgomery County and the Towns of Christiansburg and Blacksburg.

# 4.4 Montgomery County

#### 4.4.1 Introduction

Montgomery County provides a combination of unattended green box drop off sites and an expanding network of consolidated collection sites to serve the rural parts of Montgomery County. Funding for all solid waste activities comes from the Utility Fund and the General Fund.

Commercial, industrial, and multi-family apartment complexes privately contract for their own refuse services. Businesses may bring their recyclable materials (but not their wastes) to the consolidated collection sites.

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# 4.4.2 Municipal Solid Waste Management Services

## 4.4.2.1 MSW Collection

The County currently operates a combination of unattended green box drop-off sites and consolidated collection sites to serve the rural portions of Montgomery County. The County is in the process of reducing the number of green box drop-off sites by replacing them with a smaller number of "full service" consolidated collection sites that accept both wastes and recyclables.

There are presently nine consolidated collection sites located throughout

Montgomery County. These sites are fenced and staffed with County employees. The
consolidated collection sites are open 7 days per week with the following operating
hours:

- Monday-Friday: 7 am 6 pm<sup>1</sup>
- Saturday: 8 am 6 pm
- Sunday: Noon 6:00 pm

The sites are equipped with a compactor that is used for household refuse and non-compacting roll off containers for all of the recyclables accepted at the MRSWA Recyclables Processing Facility (RPF), including commingled containers, newspaper, white office paper and corrugated. Used motor oil is also accepted at the sites if it is brought to the sites in closed containers. Brush is not collected at the sites. Large household items and tires are also accepted at the sites.

There are numerous advantages to the "full service" consolidated collection sites, including the following:

- 1. Supervision of the materials received
- 2. Operation of a compactor unit
- 3. Call-for-pickup transportation system
- 4. Opportunity for enhanced recycling and ongoing education

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<sup>&</sup>lt;sup>1</sup> Monday – Friday hours are 7:00 am – 7:00 pm during daylight savings time.

- 5. Provides for shifting to a weight based or pay-as-you-throw fee structure
- 6. Prevents out-of-county dumping

These "full service" consolidated collection sites have been established at all nine of the locations identified in the 1992 Solid Waste Management Plan. The locations are Prices Fork, Coal Bank Hollow, Ellett, Elliston-Lafayette, Riner, Merrimac, Rogers, Plum Creek and Christiansburg Wayside, as well as the full service option at the MRSWA main facility at the old Mid-County Landfill site. In response to public demand, as funding becomes available and as new traffic patterns emerge additional sites may also be identified.

The County operates two roll-off trucks to service the consolidated collection sites and two front-end loaders to service the green box sites.

# 4.4.2.2 MSW Recycling and Waste Reduction

Montgomery County provides 9 consolidated collection sites that are attended and 2 sites which are not attended. At the sites, citizens can drop off their MSW as well as recyclable materials: newspaper, magazines, commingled containers and cardboard. The consolidated collection sites also take motor oil, tires, vehicle batteries, and white goods in addition to other recyclable materials.

Funding for all recycling activities comes from the Utility fund and the General fund.

## 4.4.2.3 MSW Special Waste Management Services

The County also sponsors an annual Paint Exchange day. Once a year, citizens can bring all of their left over paint to a designated location and exchange it for another citizen's paint. This activity keeps paint out the waste stream, it cannot go into the landfill because it is liquid, and it reduces the amount of household hazardous waste.

Every year the County participates in an annual "Household Hazardous Waste Day" to collect household hazardous materials that can be recycled. Currently, items

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collected include batteries, antifreeze and solvents. This limits the amount of hazardous waste that makes it to the landfill, allows citizens to easily remove dangerous materials from the household, and promotes recycling.

This past year, the MRSWA and the New River Resource Authority (NRRA) jointly hosted the first ever electronics recycling event in Southwest Virginia. The 2-day special collection event, held at the MRSWA RPF, provided residents and businesses with an opportunity to recycle old computers. The County supported this event and encouraged its residents and businesses to participate.

# 4.4.2.4 Illegal Dumping

Montgomery County has cracked down on illegal dumping by employing a compliance officer. This officer has the authority to investigate, summons, and convict illegal dumping offenders. As a result, the rate of illegal dumping has decreased, but is still a concern in the County.

# 4.5 Virginia Tech

## 4.5.1 Introduction

Virginia Tech utilizes a combination of in-house collection crews and contracted services to manage MSW, and operate the recycling program (Virginia Tech Recycling). Specialized wastes are usually referred to the Environmental Health and Safety Office.

While the university's recycling percentage has slipped during the period 2001-2003, and budget cuts have reduced Virginia Tech Recycling (VTR) staff, campus recycling remains a regular feature of Physical Plant operations. Crews provide daily collection of Corrugated Cardboard with a rear-load packer truck, and twice-weekly collection of Commingled Containers. A drop site in the Overflow Parking Lot provides bins for volunteer recycling of Sorted Office Paper, Glossy Magazines, Newspapers, Corrugated Cardboard, Commingled Containers, and from October-February, phonebooks and campus directories. Student Move In, prior to the opening of the fall semester, is a major focus for VTR, with much work given to collecting the

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15-20 tons of Corrugated Cardboard generated. During Student Move Out, prior to Commencement, provision is made for collection of usable discards, which are donated to the Blacksburg YMCA Thrift Store. Establishment of Consolidated Recycling and Refuse Sites for all Residence Halls, and incorporation of recycling sites for new buildings will ensure that recycling remains a part of support services into the future.

With a website, a phone directory address, and notices in The Hokie Handbook, In Store, and other campus publications, the Virginia Tech Recycling office has made itself accessible, and provided material support for students organizations interested in promoting and improving campus recycling. A network of student organizations assists the 70-80 offices, campus-wide, which manage their recycling on a volunteer basis. In 2003, a new task force, ACCES (Advisory Council for Campus Environmental Sustainability) was instituted. Reporting to the VP for Administration, this task force is expected to make recommendations for improving Virginia Tech's "environmental sustainability," including recommendations for improving the recycling program. A critical task within the next five years will be the preservation of the current Recycling Coordinator position, when the current jobholder retires or leaves, and the hiring of a successor with adequate energy and resources for the tasks ahead.

Composting has been an area of continuing interest for the university, with numerous, cooperative initiatives between VTR and the Department of Crop and Soils Environmental Sciences. Both brush/pallet mulching and leaf windrow composting take place at the university's Toms Creek Basin Facility. Mulch and compost produced at this facility are used on and off campus for the Horticulture Gardens, Peace Garden, Blacksburg Community Gardens, etc.

Along with the other member jurisdictions, Virginia Tech participates in the annual "Broomin' & Bloomin" County-wide cleanup, and has lent support to the "E-Waste" recycling events conducted by MRSWA.

Virginia Tech saw sharply increasing tip fees imposed by Montgomery County from about 1987-1993, but with the formation of MRSWA, tip fees leveled off, and have begun to

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decline. Savings over the past ten years as a result have been significant. Over the next twenty years, with the anticipated growth of the New River Valley, this trend should continue, although in "absolute terms," annual spending on tip fees for waste disposal will continue to climb.

# 4.5.2 Municipal Solid Waste Management Services

#### 4.5.2.1 MSW Collection

With over 100 major buildings, several major building projects underway and more projected for at least a decade, four dining halls, a hotel, a veterinary college, numerous specialized science labs, varied agricultural facilities, 8500+ students living in campus Residence Halls, and a total daily population during the school year of approximately 32,000 faculty, staff, and students, Virginia Tech is a large, complex institution. MSW collection must therefore be dependable, flexible, and capacious. VTR consequently depends heavily upon contract services to supplement in-house collection. The university's waste stream is not constant over the calendar year, but increases dramatically at the beginning and end of the academic year, and tapers off as dramatically during the summer months. Yet these cycles are counterbalanced by others: pruning and mowing operations during the growing season; disruptive infrastructure renovations and surplus of dorm furniture during the summer; capital construction projects during all months of the year. Indeed, only a portion of the university's total MSW is covered by this report, as renovation and new building contractors are responsible for disposal of project wastes, much of it C&D. Occasional efforts have been made to track and capture some portion of this waste, but very considerable difficulties have prevented much progress in this area.

MSW collection from Residence Halls has historically been among the most difficult challenges. Installation of large-volume compactors at the major Halls has helped substantially; shifting responsibility for handling of personal trash and recyclables to students themselves, and away from Housekeepers, has also been a very significant

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advantage. This latter process began during the 1999-2000 school year, and of this writing, in May, 2004, the last Consolidated Site for trash and recycling, located near O'Shaughnessy Residence Hall, is close to completion.

## 4.5.2.2 MSW Recycling and Waste Reduction

Student activism in the mid-to-late 1980's, with support from concerned faculty, initiated campus-wide, volunteer recycling of aluminum cans, which then expanded to include paper. The broad, public outcry over our "throwaway society" and the perceived crisis of landfill capacity both added impetus to the activism. To manage the rapid growth of the nascent recycling program, and meet state recycling guidelines, the university hired a part-time recycling coordinator in 1990. In 1991, the position became full-time, with expanded responsibility for management of MSW collection, both in-house and through contracted services. In the years following, basic features of Virginia Tech Recycling (VTR) emerged: a daily collection route for corrugated cardboard; installation of four, 20 cubic yard rolloffs for collection of recyclables at the dining halls, and one exclusively for collection of paper at Derring Hall; development of a daily collection route for paper; shifting of trash crew duties to include recycling; initiation of leaf composting and brush/pallet mulching at the closed VT landfill; various "public education campaigns" to expand awareness of recycling.

Development of VTR coincided with the formalizing of recycling programs nationwide, and VTR came into contact with many of these programs through the College and University Recycling Council (CURC) and its listserv. Simultaneously, peer institutions in Virginia joined together to create VA-CURC, with recycling issues of common concern shared among Virginia Tech, University of Virginia, George Mason University, James Madison University, and Virginia Commonwealth University. Unlike the other universities of VA-CURC, Virginia Tech was bound to a partnership with the local jurisdictions of Blacksburg, Christiansburg, and Montgomery County, who in

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concert developed the Montgomery Regional Solid Waste Authority, with its Transfer Station and Recyclables Processing Center, which opened in 1995. The "Users' Agreement," which required member jurisdictions to send their MSW and recyclables to MRSWA, has shaped the growth and direction of recycling at Virginia Tech. Overall, despite difficulties—the transfer of recycling revenues from VT to MRSWA, for example—the partnership with MRSWA has been beneficial, and should secure the long-term future of campus recycling, and provide leadership in areas of emerging importance, such as E-Waste recycling.

Growth of campus recycling slowed in the late 1990's, and the university's recycling percentage leveled off at about 25%. Matched by a general cooling of public interest in recycling, and fluctuating market prices for recyclables, recycling programs nationwide experienced increased criticism as benefits were weighed against costs. VTR was no exception, and eventually, in the face of severe, university-wide budget cuts in 2002, VTR lost three staff positions. The immediate impact was the cessation of the paper collection route, which for many members of the VT community was the heart of the recycling program. This and other infrastructure changes caused a slow erosion of the university's recycling rate. As had happened a decade earlier, student activists and concerned faculty once again stepped in to maintain paper collection on a volunteer basis, at least in some offices. Basic underpinnings of campus recycling, and daily operations of VTR, remain stable, however.

## 4.5.2.3 MSW Special Waste Management Services

The occasional appearance of bio-hazardous wastes in MSW containers serviced by in-house crews or through contract services, and other problematic waste issues, are referred to the Environmental Health and Safety Office.

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## 4.6 MRSWA

### 4.6.1 Introduction

The Montgomery Regional Solid Waste Authority (MRSWA or the Authority) was formed in December 1994 to provide MSW transfer, hauling and disposal services, as well as recyclables processing services, to the residents, businesses, industries and institutions in Montgomery County.

These services are provided in conjunction and coordination with the MSW and recyclables collection services provided by the County, the Towns of Blacksburg and Christiansburg, and Virginia Tech.

The Authority's services are provided in two major facilities: the RPF and the Transfer Station. A chart of the MRSWA organization is provided in Figure 4-1.

As shown, the MRSWA is managed by an Executive Director who reports directly to a Board of Directors. The MRSWA Board is comprised of representatives from each of the four governments served by the MRSWA – namely, Montgomery County, Town of Christiansburg, Town of Blacksburg, and Virginia Tech.<sup>1</sup>



Figure 4-1
MRSWA Organizational Chart

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<sup>&</sup>lt;sup>1</sup> As a State university, Virginia Tech is in actuality a part of the Commonwealth of Virginia State Government.

The MRSWA has an Executive Director who is responsible for the timely and efficient provision of all MRSWA services. Reporting to the Executive Director are three managers, each of whom are responsible for the operation of the three major facets of the MRSWA – solid waste management, recyclables processing and recycling education.

## 4.6.1.1 MSW Transfer

The MRSWA provides MSW transfer and hauling services for the residents and businesses in Montgomery County, the Towns of Blacksburg and Christiansburg, and Virginia Tech.

Currently, about 58,000 tons of MSW pass through the transfer station per year. At the transfer station, the MRSWA charges a \$47.50/ton tipping fee to cover costs of transportation, the tipping fee at New River Resource Authority's (NRRA) Regional Landfill, labor, and other overhead costs. Large tractor-trailers haul an average of 19.5 tons at a time to the NRRA Regional landfill near Dublin, VA. MRSWA must also pay a tipping fee to NRRA for disposal at their landfill.

## 4.6.1.2 MSW Disposal

Approximately 170,000 tons per year are currently disposed at the NRRA Regional Landfill, which has an anticipated site life of 100 years at the current filling rate. As a member of the NRRA, the MRSWA will able to utilize the disposal capacity at the NRRA Regional Landfill over the entire site life of the facility.

### 4.6.1.3 MSW Recycling and Waste Reduction

## 4.6.1.3.1 Recyclables Processing Facility

The Montgomery County Regional Solid Waste Authority

(MRSWA) owns and operates a Recyclables Processing Facility (RPF) in

Christiansburg, Virginia. The RPF provides recyclables processing services for
the Towns of Christiansburg and Blacksburg, Virginia Polytechnic Institute and

State University and Montgomery County. In addition, it serves Pulaski

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County, the City of Radford, the City of Salem and Giles County and receives recyclable products and materials from local industries. Finally it serves as a "buyback center" by purchasing recyclable commodities from local citizens and businesses.

Built in 1996, the RPF is designed to process up to 80 tons per day of recyclables that are brought to the RPF in two recyclable material streams.

One stream consists of source-separated paper products, including newspaper, magazines, office paper, white ledger and corrugated cardboard (The Authority stopped accepting mixed paper in April 1998). These fibrous materials are brought to the RPF in separate loads and are processed by RPF workers who hand pick contaminants from the materials before they are baled for sale to secondary materials markets.

The second stream of recyclables consists of commingled containers, including glass bottles and jars (clear, green and brown), plastic milk jugs and soda bottles (natural and colored), and steel and aluminum cans. These containers are separated by a combination of mechanical and manual techniques into their respective container types and colors and are subsequently processed for sale to secondary materials markets.

The commingled collection strategy has been working well.

Compartment recycling containers now fill up more efficiently, when aluminum, tin, glass, and HDPE were separated out. The decision simplifies the drop-off and curbside programs. However, individuals must currently bring aluminum cans to the RPF to receive a payout for them. Once at the RPF, the commingled containers are separated on the commingled sort line, which begins with a machine that utilizes Trommel-Mag; line attendants then follow up on the line.

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The RPF currently receives and processes a number of specialty recyclable products and materials from local industries, including nylon tubing, zip ties, floss, plastic film, and plastic containers in large quantities. The RPF actively pursues the processing of industrial recyclables that can be delivered in large enough quantities to produce revenues from their recovery and sale.

The Buyback Center currently purchases aluminum cans, scrap aluminum, copper, brass, insulated wire and other marketable products from local citizens and businesses.

## 4.6.1.3.2 Recycling Markets

The availability of markets for recyclable materials determines the success of local recycling programs. Without adequate markets and recycling revenues, the economic costs associated with the processing of recyclable materials favor the resumption of the landfill disposal of these materials. It is important to realize that this cost comparison does not mean that recycling must generate a profit or even significant revenue in order to be considered economically viable.

The investment of capital resources in the creation of the 48,000 square foot RPF has significantly improved the MRSWA region's access to reliable markets for recovered materials. However, even with this advantage, extreme care must be taken to secure back up options for the beneficial utilization of recovered materials, as the recycling market pricing trends remain very volatile. Important steps, which have been undertaken by the MRSWA Director of Recycling Services, include:

- 1. Consistently high quality Recyclable Materials delivered to markets; little to no contamination in bundles of material sold
- 2. Establishing and maintaining relationships with the marketing representatives
- 3. Open market policy with multiple market options

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4. Assessment and development of high volume alternative options (i.e. composting, brush mulching, glass aggregate, etc.)

Recyclable materials, like any other commodity, vary in value with supply and demand, thus significant fluctuations in the market prices for these materials occur over time. Increasingly, recycling markets and recycling facilities are becoming aware of the interconnected global nature of recycling prices. For example, in 1998, aluminum, steel, OCC, plastic, and glass all fell dramatically, as a result of over supply and very low demand. These local recycling stresses were a result of such far-reaching effects as foreign economic crises, labor strikes, and mill downsizing.

### **4.6.1.3.3** Education

The MRSWA employs a full-time Education Coordinator.

Educating the public is a key component of a successful recycling program.

Without adequate public participation, area recycling programs will not be as effective

Community awareness involves three components:

- 1. Education
- 2. Promotion
- 3. Convenient Recycling Opportunities

Education efforts typically focus on community sectors, including business, industry and youth with the objective of encouraging recycling as a habit. Educational and promotional efforts target all age groups. Education and promotion have two basic goals:

- 1. Educating the public about solid waste disposal issues.
- 2. Educating the public about the opportunities for reusing and recycling materials to ultimately reduce landfill tonnages and address waste disposal issues.

Promoting recycling is like promoting any other program, service, or product; it involves: 1) getting the message across as often as possible,

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2) placing the message in as many places as possible; 3) communicating the messages in as many ways as possible; and 4) attracting as much positive attention as possible.

The Education Coordinator also performs waste audits for companies to encourage recycling. A waste audit entails taking inventory of the current waste stream produced. Materials that can be recycled are identified along with disposal or transportation options. In a sense, the coordinator performs cost analyses of the company's waste management program. With the information provided, the company can determine the cost of its current waste program as well as identify areas where improvements can be made.

The Education Coordinator produces materials and programs to educate the public about MRSWA operation. Printed media is designed to inform the public about solid waste solutions within the solid waste management realm. Proper sorting, upcoming programs and general operating information is covered continuously due to the changes and growth in the region's population.

Programs conducted on or off-site are designed to provide as much information about the recycling processing facility, current environmental issues surrounding solid waste management and recycling, and alternative methods for landfill disposal. Depending on the group attending the program, each presentation is created with various elements in mind. These include number of people, age range, time frame, and space needed. Students from the schools in the area tour the facility and then are given information that parallels with the Virginia State Standards of Learning. Various activities are used to reinforce topics being discussed. Civic and community groups receive pertinent information including accepted recyclables, upcoming events and answers to any of the group's questions.

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All programs and materials promote MRSWA and the efforts being put forth to provide services to address the region's various waste management needs.

## 4.6.1.3.4 Partnerships

The Towns of Blacksburg and Christiansburg, Montgomery

County, and Virginia Tech also provide continuing education and promotional
information. Each jurisdiction has a web site with information about programs
and the waste hierarchy. Further, all jurisdictions promote and encourage
participation in:

- 1. Adopt-a-Stream,
- 2. Adopt-a-Highway,
- 3. Adopt-a-Spot, and
- 4. Adopt-a-Park.

The Virginia Department of Transportation provides substantial assistance to and oversees the Adopt-a-Highway program.

The Adopt-a-Spot program is modeled after the familiar Adopt-a-Highway program. Participants may adopt a mile or more of a street, park, walking/bike paths, green box sites, bus stops, and other public areas. Similar to the Adopt-a-Highway program a sign displays the person or group responsible for the "Spot." Program requirements include:

- 1. Participation through the program coordinator,
- 2. A minimum of four clean-ups per year; two of which are statewide clean-up days, and
- 3. Participation in a meeting on safety concerns and conditions.

Adopt-a-Stream was initiated by the Izaak Walton League, and has been on going since fall 1990. Coordination continues through the IWL; there is no incentive program in support of Adopt-a-Stream, although Town and County personnel will assist with efforts on a case-by-case basis.

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## 4.6.1.4 MSW Special Waste Management Services

### 4.6.1.4.1 Tires

The Commonwealth of Virginia prohibits the landfilling of whole tires because of their buoyancy in landfills.

The MRSWA collects and processes tires at the tire permit area located between the RPF and the closed landfill. The MRSWA contracts to have the tires shredded.

## 4.6.1.4.2 White Goods

White Goods represent 1.8% of the municipal household solid waste stream (Franklin Associates). White Goods must also be "processed" before they can be recycled. Prior to 1988 scrap metal dealers would accept white goods to recycle, now they are refused because of potential PCB (polychlorinated biphenyl) contamination. Less than 2% of the white goods received at the landfill contained PCB's, and in those cases only electric motors and capacitors contained the contaminant. Since that time, legislation requiring the recovery of the refrigerants (typically CFC based formulas) in refrigerators, freezers, and air conditioning units has added to the complications of handling white goods. The specific freon formula recovered from these units varies among different types of devices and must be kept separate in order to be recycled and/or reused. MRSWA has several freon recovery units that remove the freon from those white goods. Currently, MRSWA accepts white goods and removes the freon and PCB containing parts and must charge an additional fee for their disposal if they contain freon.

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## 4.6.1.4.3 Stumps

Stumps represent a difficult portion of the waste stream to estimate. The stump disposal policy created by the Board of Supervisors during the 1980's is as follows:

- 1. Dispose of out-of-county
- 2. Burn on-site
- 3. Buried on-site
- 4 Ground on-site

## 4.7 Existing Systems - Construction and Demolition Wastes

A relatively small amount of construction and demolition (C&D) wastes (3,500 tons out of an estimated 54,000 tons) is currently brought each year to the MRSWA Transfer Station for disposal. The remaining C&D waste is either recycled, used as fill, disposed of in inert landfills or disposed of in regional C&D landfills. For example, it is believed that a substantial amount of the C&D waste generated in the Montgomery County planning region is hauled to the Bandy C&D landfill (Roanoke County) or the Ham Sanitary Landfill (Peterstown, WV) for disposal.

## 4.8 Existing Systems – Industrial Waste

Industrial waste is generated by a number of industries located in the planning region, including Corning, Federal Mogul, the Radford Army Ammunition Plant, Wolverine, Hubbell, Rowe Furniture, Tetra, Metal X, Poly Scientific, Electro Tec, C&S Door, and Marshall Ready Mix.

It is believed that none of these facilities operate their own industrial waste landfills. Therefore the industrial waste generated at these facilities is either recycled or is disposed of at regional MSW landfills.

Of the industrial waste generated annually, data is only available for ash generated by the Virginia Tech Power Plan (about 7,000 tons per year) and fired cullet and dust from Corning (2,100 tons per year). Both are used as alternative daily cover at the NRRA Regional Landfill.

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## 4.9 Existing Systems – Regulated Medical Wastes

Regulated medical waste is generated by the two major hospitals in the planning region – the Montgomery Regional Hospital and the Carilion New River Valley Hospital. These facilities contract with private medical waste service providers for the management of their regulated medical wastes.

#### 4.10 Conclusions

This section has presented detailed information regarding the services and systems that are in place to manage the solid waste streams generated in the Montgomery County planning region that are addressed in the Virginia solid waste planning regulations.<sup>1</sup>

The following observations can be made with respect to the systems, programs and services that are currently in place to manage these wastes.

- Long Term MSW Disposal Capacity is Available The MRSWA is a member of the NRRA which provides MSW disposal services for the Montgomery County planning region. Due to the large amount of remaining capacity of NRRA's Regional Landfill, it appears that there is ample capacity to provide for the MSW disposal needs of the Montgomery County region for the 20-year period covered by the plan (2004-2023). A significant advantage associated with this disposal option is that it is under public control, meaning that a public body is responsible for establishing disposal prices, as well as the types and quantities of wastes that are disposed at the facility.
- C&D Disposal Services Are Privately Provided For the most part, C&D waste is disposed of in either large regional private landfills or small C&D disposal sites located throughout the planning region. For this reason there is little public control over the future capacity that will be available throughout the planning period to manage this waste stream. C&D is accepted at MRSWA facilities.
- The MRSWA RPF Has Additional Processing Capacity The MRSWA RPF is operating at only about 50% of its rated capacity of 80 tons per day. This means that it should be able to serve the recyclables processing needs for the entire region throughout the planning period. In addition, it should be able to expand the recyclable processing services it offers to businesses and industries within Montgomery County as well as to provide these services to other counties in the region.
- Flow Control May Become A Significant Issue From the waste disposal data provided in Section 3, it appears that less than half of the waste coming to the MRSWA Transfer Station is under "public control"; i.e., is collected directly by or under contract to public agencies and can therefore be required to utilize the

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<sup>&</sup>lt;sup>1</sup> Virginia Waste Management Board. 9 VAC 20-130-10 et seq. Regulations For Solid Waste Management Planning, Amendment 1.

MRSWA facilities. Due to the U.S. Supreme Court decision in 1994 that struck down local government regulatory flow control, there is a possibility that private haulers will opt to use cheaper disposal facilities located outside of the MRSWA service area. Since the MRSWA is funded by recycling revenues and tipping fees received for waste and recyclables brought to the MRSWA facilities, the potential loss of tonnages at these facilities could create financial issues for the MRSWA. As stated in Section 3, it appears that over 17,000 tons of MSW are already "leaking" out of the system and being taken to other public and private disposal facilities.

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### **SECTION 5.0**

### SOLID WASTE MANAGEMENT GOALS AND PLANS

### 5.1 Introduction

The statutory goals of the State of Virginia planning regulations were presented in Section 1. The purpose of this section is to document the solid waste goals and objectives that have been adopted by each of the local governments and other organization that are party to this plan.

## 5.2 Solid Waste Management Hierarchy

The United States Environmental Protection Agency (EPA) has ranked the most environmentally sound strategies for MSW. Source reduction (including reuse) is the most preferred method, followed by recycling and composting, disposal in combustion facilities, and lastly, landfills.

Currently, in the United States, 30 percent is recovered and recycled or composted, 15 percent is burned at combustion facilities, and the remaining 56 percent is disposed of in landfills. This hierarchy has also been adopted by the State of Virginia in the promulgation of its state planning regulations.

The local governments and organization that are participating in this plan have also embraced this hierarchy (see Figure 5-1). With respect to solid waste, these organizations feel that it is best to reduce, reuse, recycle, and then landfill, in that order.

Reducing involves throwing away less waste through purchasing products with less packaging for example. Reusing is just as it sounds, instead of throwing away an old term paper use it for scratch paper. Recycling involves breaking down a material to make something new out of it. Finally, the main method of waste disposal is burying it in a landfill.

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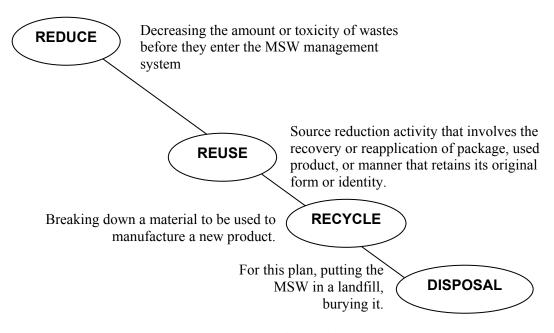


Figure 5.1
The Solid Waste Management Hierarchy

## 5.3 General Goals and Objectives

The Montgomery Regional Solid Waste Plan Steering Committee established the following general goals and objectives for the entire region:

- 1. Maintain solid waste disposal services for all residents consistent with available means and resources.
- 2. Promote source reduction and pollution prevention by commercial, private, and government sectors of the community through proper disposal of medical hazardous waste, legislation, ordinances, public awareness programs, and direct technical assistance to business and industry.
- 3. Increase flow of recyclables by expanding collection programs and increasing focus on encouraging commercial recycling efforts.
- 4. Increase community awareness of illegal dumping, litter control efforts, and household hazardous and medical waste.
- 5. Encourage recycling as a means of reducing the waste stream and promoting environmental concerns beyond the mandated recycling rates through such mechanisms as tipping fees, composting, expanded drop-off and curbside collection, reuse and exchange opportunities, and other regional programs.
- 6. Maintain and expand the recycling market options available to the region through the consistent high quality of all materials, which are shipped from MRSWA's Recycling Processing Facility; the development and maintenance of superlative relationships with market personnel; and the encouragement and support of local value added utilization of locally recovered materials.

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- 7. Address current and ongoing monitoring and maintenance needs for the closure and oversight of landfills within the county, including continuing the siting and development of addition consolidated sites throughout the county.
- 8. Explore new and innovative options for solid waste disposal and recycling.

## 5.4 Specific Plan Goals

The Solid Waste Management Plan Goals are tied not only to regulatory mandates and operational necessity but also to the Comprehensive Plans for the member jurisdictions. In light of these comprehensive plans, the following goals were also endorsed by the Steering Committee.

- 1. The primary goal of this plan is to protect the public health, safety and welfare of Town of Blacksburg, Town of Christiansburg, Virginia Tech, and Montgomery County residents and the environment.
- 2. Continue and expand programs to educate residents and businesses about source reduction, reuse, recycling, and disposal of solid waste.
- 3. Continue and expand efforts to implement comprehensive, effective, and environmentally sound waste management programs.
- 4. Meet all applicable environmental regulation.
- 5. Meet the Commonwealth of Virginia's recycling mandates of 25% and exceed these recycling levels where possible and economically feasible.
- 6. Prepare a plan in compliance with the requirements set by the Department of Environmental Quality.
- 7. Address each component of the solid waste management hierarchy.
- 8. Achieve safe and effective closure of existing disposal facilities.
- 9. Operate all components of the solid waste management program in an environmentally aware manner.
- 10. Seek to address long-term environmental issues and concerns.
- 11. Establish a development program for solid waste management that is fiscally sound.
- 12. Establish a basis for long-range capital improvements.
- 13. Identify an effective funding strategy.

## 5.5 Town of Blacksburg

The Town of Blacksburg has adopted the following goals for its solid waste program over the planning period.

### A. Solid Waste Goals:

- 1. Limit hazardous materials in the waste stream
- 2. Educate citizens about identifying hazardous waste & what to do with it
- 3. Educate citizens on options for reduction, reuse, and recycling
- 4. Continue to reduce waste
- 5. Increase Reuse of materials
- 6. Continue to work with businesses to increase recycling

## B. Recycling Goals:

- 1. Complete implementation of apartment recycling program
- 2. Improve quality of products

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- 3. Improve recycling programs in Town buildings
- 4. Enhance education
- 5. Continue to work to improve electronics recycling in the region
- 6. Work with the MRSWA to promote alternatives to landfilling such as composting
- 7. Work with the MRSW to expand the types of materials and products that can be recovered for recycling

### C. Education Goals:

- 1. Encourage groups/organization to request informational meetings/ presentations
- 2. Continue to improve Town's Recycling web site and link to MRSWA site
- 3. Continue to improve use of public access television and Town newsletters

## 5.6 Town of Christiansburg

The Town of Christiansburg has adopted the following goals for its solid waste program over the planning period:

### A. Solid Waste Goals:

- 1. Increase collection efficiency
- 2. Improve education
- 3. Continue post closure activities of Christiansburg landfill

## B. Recycling Goals:

- 1. Expand recycling program
  - a. Cardboard
  - b. Scrap metals
  - c. Paint exchange
  - d. Reduce hazardous waste
- 2. Increase collection efficiency
- 3. Reduce contamination
- 4. Improve education
- 5. Continue to work to improve electronics recycling in the region
- 6. Work with the MRSWA to promote alternatives to landfilling such as composting

### 5.7 Virginia Tech

Virginia Tech has adopted the following goals for its solid waste and recycling programs over the planning period.

### A. Solid Waste Goals:

- 1. Improve collection efficiency
- 2. Restore daily campus litter control crew
- 3. Standardize exterior refuse receptacles

## B. Recycling Goals:

- 1. Increase collection efficiency
- 2. Reduce collection cost
- 3. Maintain current contamination levels; reduce, where practicable

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- 4. Continue composting/mulching operations at Toms Creek Basin facility; support efforts to create regional composting facility through MRSWA.
- 5. Cooperate with MRSWA, or develop independent programs, for capturing specialized recyclables (i.e., E-waste, toner cartridges)
- 6. Support ACCES initiatives

## **5.8 Montgomery County**

Montgomery County has adopted the following goals for its solid waste program over the planning period.

## A. Solid Waste and Recycling Goals:

- 1. Eliminate uncontrolled open-top box sites
- 2. Expand number of consolidated collection sites
- 3. Increase capacity of existing consolidated collection sites through the addition of equipment and/or the extension of operating hours.

#### 5.9 MRSWA

The Montgomery Regional Solid Waste Authority has adopted the following goals for its solid waste program over the planning period.

## A. Solid Waste Goals: (1)

- 1. Maximize waste stream capture
- 2. Minimize tipping fees to NRRA; stabilize and/or reduce tipping fees at the transfer station
- 3. Eliminate hazardous and/or medical waste in incoming loads
- 4. Develop long-term solution for tire disposal
- 5. Conduct a pilot program for the composting of leaves and grass clippings
- 6. Evaluate the feasibility of sewage sludge composting
- 7. Develop web site for the Authority.

# B. Recycling Goals: (1)

- 1. Cover financial responsibilities of the Recycling Processing Facility
  - a. Operating expenses
  - b. Prorated administrative costs
  - c. Depreciation cost on equipment and facility
- 2. Eliminate hazardous and/or medical waste in recyclables
- 3. Increase flow
- 4. Explore new programs such as adding new materials or products for recovery through the RPF to respond to future market conditions
- 5. Improve incoming and outgoing quality of recyclables
- 6 Expand the regional program for the management and recycling of electronics wastes and universal wastes.
- 7. Continue to expand industrial recycling programs.

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# C. Education Goals<sup>(1)</sup>

- 1. Continue to expand curriculum for solid waste/Recycling/Litter Prevention educational materials
- 2. Continue to explore opportunities available for community outreach.
- 3. Expand educational outreach for commercial recycling programs and include recognition incentives.
- 4. Construct a Recycling Education Center.

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<sup>&</sup>lt;sup>1</sup> Not in order of priority.

### **SECTION 6.0**

## EVALUATION OF FUTURE SOLID WASTE MANAGEMENT ALTERNATIVES

### 6.1 Introduction

The projected types and quantities of solid waste that will require proper management over the planning period were presented in Section 4. The purpose of this section is to present the future solid waste management facilities and services that are scheduled for evaluation and/or implementation to address future needs.

The future plans and activities of each jurisdiction and organization are presented for each major waste stream and special waste substream. The alternatives considered by each jurisdiction in addressing future solid waste needs are presented in Appendix A.

## 6.2 Future Systems and Services – Municipal Solid Waste Management

#### 6.2.1 Introduction

As indicated in Section 4, the MSW stream is projected to grow from about 80,000 tons per year (308 tons per day, or TPD) in 2004 to 92,500 tons per year (356 TPD) in 2023.<sup>1</sup>

### **6.2.2** Assessment of Existing Systems

The local governments, residents, businesses and institutions rely, for the most part, on the MRSWA transfer station to receive the MSW collected in the region. The MRSWA subsequently transfers and hauls the MSW to the NRRA Regional Landfill for disposal.

The MRSWA Transfer Station has a daily capacity of 1,000 tons per day. Therefore it is concluded that the Transfer Station will be able to accommodate the MSW transfer needs for the region over the planning period.

The NRRA Regional Landfill is a 350-acre landfill that currently disposes of approximately 170,000 tons per year. About one third of the waste disposed at the NRRA landfill – 57,000 tons per year – is sent to the landfill from the MRSWA Transfer Station. At the current rate of disposal, the NRRA Regional Landfill is estimated to have a service life of 100 years.

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Therefore, it is concluded that the NRRA Regional Landfill will be able to provide the MSW disposal capacity required for the region throughout the planning period.

# **6.2.3** Future Systems and Services

The future plans regarding MSW management for each jurisdiction participating in this Plan are summarized in Table 6-1.

Table 6-1. Municipal Solid Waste Management – Future Systems and Services					
MSW Projections	FY 2004/05		FY 2023/24		
3	Tons Per Year	Tons Per Day	Tons Per Year	Tons Per Day	
	79,969	308	92,507	356	
Jurisdiction	Existing Systems				
MRSWA	<ul> <li>Sufficient capacity exists at MRSWA Transfer Station to handle projected waste tonnages for the planning period</li> <li>Sufficient disposal capacity exists at NRRA Regional Landfill (100 year disposal capacity at current filling rate) to dispose of projected MSW tonnages for the planning period</li> </ul>				
	Future Systems and Services				
Montgomery County	<ul> <li>Increase capacity at two collection convenience centers</li> <li>Continue to convert and consolidate remaining green box sites to collection convenience centers</li> </ul>				
Town of Blacksburg	Continue to utilize MRSWA transfer and disposal services				
Town of Christiansburg	Continue to utilize MRSWA transfer and disposal services				
Virginia Tech	Continue to utilize MRSWA transfer and disposal services				
MRSWA	Explore feasibility of offering a packaged collection/disposal service to commercial customers				

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<sup>&</sup>lt;sup>1</sup> Tons per day (TPD) figures are based on 5 work days per week or 260 work days per year.

All of the jurisdictions in the region – Montgomery County, the Towns of Blacksburg and Christiansburg, and Virginia Tech – plan to continue to utilize the MRSWA Transfer Station for MSW transfer and disposal services throughout the planning period.

Specific activities planned by individual jurisdictions or institutions regarding future MSW management alternatives are summarized below.

## **6.2.3.1 Montgomery County**

As indicated, Montgomery County plans to continue the conversion of its green box collection system to a consolidated convenience center collection system. In addition, the County plans to expand the capacity at two of its consolidated collection sites to meet the needs of the growing service populations using those sites.

### 6.2.3.2 MRSWA

To address the issue of flow control described in Section 4.6, the MRSWA intends to explore the feasibility of offering a packaged collection/disposal service to commercial and industrial customers in the planning region.

## 6.3 Future Systems and Services – Recyclable Materials

### 6.3.1 Introduction

Recyclable materials include both "Principal Recyclable Materials" (PRMs) and "Supplemental Recyclable Materials (SRMs). PRMs are recyclable materials recovered from the MSW stream while SRMs are recyclable materials recovered from other waste streams such as industrial wastes or C&D wastes. PRMs include both manufactured recyclable materials (MRMs) such as paper, plastic bottles, and metal cans, as well as yard wastes.

As indicated in Section 4, the MRSWA Materials Recycling Facility (MRM) portion of the PRM stream is projected to grow from about 31,000 tons per year (119 TPD) in FY 2004/05 to 35,800 tons per year (138 TPD) in FY 2023/24. Similarly, the yard waste portion of the PRM stream is projected to grow from about 9,600 tons per year (37 TPD) in FY 2004/05 to 35,800 tons per year (138 TPD) in FY 2023/24.

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The SRM stream is projected to grow from about 6,625 tons per year (25 TPD) in 2004 to 7,663 tons per year (29 TPD) in 2023.

## 6.3.2 Assessment of Existing Systems

The local governments, residents, businesses and institutions rely, for the most part, on the MRSWA Recyclables Processing Facility (RPF) to receive and process the manufactured recyclable materials (MRMs) collected in the region.

The MRSWA RPF has a daily capacity of 80 tons per day based on a single shift per day operation. Currently the RPF is processing approximately 7,400 tons per year or about 28 tons per day. As indicated in Table 6-2, if the RPF received all of the manufactured recyclable materials estimated for the year 2023, it would be required to process 138 tons per day. This could be accomplished at the RPF by adding a second processing shift. Therefore it is concluded that the RPF will be able to accommodate the MRM processing needs for the region over the planning period.

The local governments, residents, businesses and institutions rely on a number of yard waste processing facilities in the region to process yard wastes. The MRSWA is currently in the process of constructing an 1,800 ton-per-year yard waste processing facility. When completed, this facility will have the capacity to serve the yard waste processing needs for the region over the entire planning period.

As indicated in Table 3-12, the MSW recycling rate for the region was reported to be 27% in 2002. Therefore the region is in compliance with the State requirement to maintain an MSW recycling rate of 25% and no additional MSW recycling programs need to be implemented to meet this requirement.

As indicated in Section 4, the MRSWA RPF depends, for the most part, on revenues received from the sale of recovered recyclables to pay for the operating costs of the facility. The future demand and prices for recyclable materials will significantly impact the future level of MSW recycling achieved in the region.

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The SRMs recovered in the planning region are currently processed at both the MRSWA RPF as well as private recycling facilities.

#### **6.3.3** Future Facilities and Services

The future plans regarding recyclables management for each jurisdiction participating in this Plan are summarized in Table 6-2 on the following page.

All of the jurisdictions in the region – Montgomery County, the Towns of Blacksburg and Christiansburg, and Virginia Tech – plan to continue to utilize the MRSWA RPF for the processing and sale of manufactured recyclable materials throughout the planning period.

For the processing of SRMs, the region will continue to rely on both the MRSWA RPF and other private recycling operations in the region.

Specific activities planned by individual jurisdictions or institutions regarding future RPF management alternatives are summarized below.

## 6.3.3.1 Town of Blacksburg

The Town of Blacksburg plans to continue to support increased levels of recycling through:

- Influencing and responding to new markets for recyclable materials and products
- Expanding recycling education programs, and
- Enhancing other recycling programs that are currently underway.

## **6.3.3.2 Montgomery County**

As indicated, Montgomery County plans to continue the conversion of its green box collection system to a consolidated convenience center collection system. In addition, the County plans to expand the capacity at two of its consolidated collection sites to meet the needs of the growing service populations using those sites. These actions should increase the tonnages of manufactured recyclable materials delivered by Montgomery County to the RPF.

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Table 6-2. Principal Recyclable Materials – Existing Systems and Future Plans					
Projections	FY 2004/05		FY 2023/24		
	Tons Per Year	Tons Per Day	Tons Per Year	Tons Per Day	
Principal Recyclab	le Materials				
Manufactured Recyclable Materials	30,948	119	35,800	138	
Yard Waste	9,596	37	11,101	43	
Supplemental Recy	yclable Materials				
	6,625	25	7,663	29	
Jurisdiction		Existing	Systems		
MRSWA	Sufficient capacity exists at MRSWA RPF to process projected tonnages of manufactured recyclable materials throughout the planning period				
	<ul> <li>Sufficient capacity exists at MRSWA yard waste processing facility (under construction) to process projected tonnages of yard waste throughout the planning period</li> </ul>				
	Future markets for recycled materials will create new opportunities to support the MSW recycling levels achieved in the region				
	<ul> <li>Continue to explore new markets and evaluate the targeting of additional products and materials for recycling and recovery.</li> </ul>				
	Future Plans				
Montgomery	Complete conversion of green box system to consolidated collection sites				
County	Continue to utilize MRSWA Recyclables Processing Facility				
Town of	Enhance Apartment Recycling Ordinance				
Blacksburg	Continue to utilize MRSWA Recyclables Processing Facility				
	Influence and respond to new markets for recyclables				
	Continue and expand recycling education programs				
	Enhance recycling programs that are currently underway.				
Town of Christiansburg	Continue to utilize MRSWA Recyclables Processing Facility				
Virginia Tech	Continue activities to support the development of a regional composting facility by the MRSWA				
	Continue to utilize MRSWA Recyclables Processing Facility				
MRSWA	Explore feasibility of offering a commercial recyclables collection service				
	Explore feasibility of offering a document destruction/recycling service				
	Construct Recycling Education Center at RPF				

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## 6.3.3.3 Virginia Tech

While concerted efforts, over a span of many years, by a number of committed VT faculty and staff, have as yet failed to realize a state-of-the-art composting research and service facility at Virginia Tech. Many researchers believe the composting of MSW substreams such as food waste, yard waste, and sludges, and the utilization of these streams in the development of bio-fuels and bio-based materials, are the most significant future recycling opportunities available to the region. Over the planning period, Virginia Tech will support and assist efforts by MRSWA to develop all, or parts, of such a facility.

### 6.3.3.4 MRSWA

To increase the throughput at the RPF, the MRSWA intends to explore the feasibility of offering a packaged collection/processing service for commercial recyclables to commercial and industrial customers in the planning region. The MRSWA will also analyze the feasibility of offering a document destruction/recycling service to businesses needing this service.

The MRSWA also intends to construct a "Recycling Education Center" at the RPF to provide a safe and instructive viewing and educational area for tours by student and citizen groups.

## 6.4 Future Systems and Services – Other Waste Streams

## 6.4.1 Introduction

Other major waste streams generated within the planning region include construction and demolition (C&D) wastes, industrial wastes and regulated medical wastes. As indicated in Section 4, C&D wastes are projected to grow from about 53,700 tons per year (207 TPD) in FY 2004/05 to 62,130 tons per year (239 TPD) in FY 2023/24. Industrial wastes are projected to grow from about 9,200 tons per year (35 TPD) in FY 2004/05 to 10,600 tons per year (41 TPD) in FY 2023/24. Regulated medical wastes are projected to grow from about 960 tons per year (4 TPD) in FY 2004/05 to 1,110 tons per year (4 TPD) in FY 2023/24.

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## **6.4.2** Assessment of Existing Systems

The local governments, residents, businesses and institutions rely, for the most part, on the private processing and disposal facilities located either within or outside the region to manage these waste streams.

### **6.4.3** Future Plans

The future plans regarding PRM management for each jurisdiction participating in this Plan are summarized in Table 6-3.

Table 6-3. Other Waste Streams – Existing Systems and Future Plans					
Projections	FY 2004/05		FY 2023/24		
	Tons Per Year	Tons Per Day	Tons Per Year	Tons Per Day	
Construction and Demolition Wastes <sup>1</sup>	53,707	207	62,128	239	
Industrial Wastes	9,188	35	10,628	41	
Regulated Medical Wastes	960	4	1,110	4	
Jurisdiction	Existing Systems				
MRSWA	<ul> <li>Sufficient capacity exists at MRSWA Transfer Station to handle projected C&amp;D waste tonnages for the planning period should the need arise</li> <li>Sufficient disposal capacity exists at NRRA Regional Landfill (100 year disposal capacity at current filling rate) to dispose of projected C&amp;D tonnages for the planning period should the need arise</li> </ul>				
	Future Plans				
All jurisdictions and institutions	<ul> <li>Continue to rely on existing private processing and disposal service providers to manage these waste streams</li> </ul>				
MRSWA	Utilize MRSWA Transfer and Disposal Capacity for C&D Wastes and Industrial Wastes Should the Need Arise				

All of the jurisdictions in the region – Montgomery County, the Towns of Blacksburg and Christiansburg, and Virginia Tech – plan to continue to rely on existing and future private processing and disposal facilities to manage these waste streams.

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Should an urgent need for C&D and/or industrial waste disposal capacity arise during the planning period, the MRSWA Transfer Station can be utilized to receive C&D wastes and/or industrial wastes and transfer them to the NRRA Regional Landfill for disposal.

## 6.5 Future Systems and Services – Special Wastes

### 6.5.1 Introduction

Special waste substreams that are generated within the planning region include:

- White goods
- Tires
- Waste Oil
- o Batteries
- Sludges

As indicated in Section 4, white goods are projected to grow from about 1,104 tons per year (4TPD) in FY 2004/05 to 1,277 tons per year (5 TPD) in FY 2023/24. Discarded tires are projected to grow from about 1,420 tons per year (5 TPD) in FY 2004/05 to 1,642 tons per year (6 TPD) in FY 2023/24. Waste oil is projected to grow from about 221 tons per year (1 TPD) in FY 2004/05 to 255 tons per year (1 TPD) in FY 2023/24. Used batteries are projected to grow from about 631 tons per year (2 TPD) in FY 2004/05 to 730 tons per year (3 TPD) in FY 2023/24. Sludges are projected to grow from about 1,104 tons per year (4 TPD) in FY 2004/05 to 1,277 tons per year (5 TPD) in FY 2023/24.

## 6.5.2 Assessment of Existing Systems

The local governments, residents, businesses and institutions rely, for the most part, on the MRSWA RPF (for tires, sludges, used batteries and white goods), as well as private retailers (for used oil and batteries), to manage special wastes.

## 6.5.3 Future Plans

The future plans regarding PRM management for each jurisdiction participating in this Plan are summarized in Table 6-4.

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<sup>&</sup>lt;sup>1</sup> Based upon National Average figures.

Table 6-4. Special Wastes – Existing Systems and Future Plans				
Projections	FY 2004/05		FY 2023/24	
	Tons Per Year	<b>Tons Per Day</b>	Tons Per Year	<b>Tons Per Day</b>
White Goods	1,104	4	1,277	5
Tires	1,420	5	1,642	6
Used Oil	221	1	255	1
Used Batteries	631	2	730	3
Sludges	1,104	4	1,277	5
Jurisdiction		Existing	Systems	
MRSWA	<ul> <li>The MRSWA RPF currently receives a number of special wastes, including white goods, used oil, sludge and tires.</li> <li>Used oil and batteries are recycled through local private retailers</li> </ul>			
	Future Plans			
All jurisdictions and institutions	Continue to rely on the MRSWA RPF and local private retailers to manage these special wastes.			
MRSWA	Explore the feasibility of sludge composting			
	• Explore the feasibility of developing a regional recycling and management program for "universal" wastes, such as fluorescent lamps and e-waste.			

All of the jurisdictions in the region – Montgomery County, the Towns of Blacksburg and Christiansburg, and Virginia Tech – plan to continue to rely on the MRSWA RPF as well as existing and future private processing and disposal facilities to manage these special wastes.

## 6.5.3.1 MRSWA

To increase the recycling rate achieved in the region, the MRSWA intends to explore the feasibility of including adding the capability to compost sludge at its yard waste processing facility.

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The MRSWA will also investigate the feasibility of serving as the regional management facility for the management of "universal wastes" such as fluorescent lamps.<sup>1</sup>

## 6.6 Implementation Schedule and Strategies

#### 6.6.1 Introduction

The implementation schedule and strategies for implementation planned for each of the systems and services identified for implementation during the planning period are presented in Table 6.5 on the following page and discussed below.

## 6.6.2 Town of Blacksburg

The Town of Blacksburg is committed to promoting recycling at its apartment complexes. The Town intends to explore a range of implementation options including increased program marketing and public education, the implementation of focused outreach program for large apartment management companies, and the implementation of a public recognition strategy for apartment owners that comply with the ordinance.

#### 6.6.3 Town of Christiansburg

The Town of Christiansburg plans to continue to provide its current solid waste and recycling services. However, it has no plans to implement new systems or services over the planning period.

## 6.6.4 Montgomery County

Montgomery County plans to continue the conversion of its green box collection system to a system of consolidated collection sites.

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<sup>&</sup>lt;sup>1</sup> Universal wastes are products containing hazardous materials, such as fluorescent lamps (mercury) and automobile batteries (lead). Federal regulations regarding the collection of these products have been eased to encourage recycling. See <a href="http://www.epa.gov/epaoswer/hazwaste/id/univwast.htm">http://www.epa.gov/epaoswer/hazwaste/id/univwast.htm</a>.

Table 6.5 – Implementation Schedule and Strategies for Solid Waste Systems and Services Identified For Implementation During the Planning Period					
Jurisdiction	System or Service	Schedule	Funding Requirement	Funding Sources	
Town of Blacksburg	Implementation of Apartment Recycling Mechanism	2004-2009	None	NA	
Town of Christiansburg	No New Services Planned	NA	NA	NA	
Montgomery County	Expansion of Capacity at Two Consolidated Collection Sites	2004-2006	\$44,000 (\$22,000 per additional compactor)	County General Fund	
Virginia Tech	Support of MRSWA Regional Composting Center	2004-2010	None	NA	
MRSWA	Feasibility Analysis of Commercial Waste Collection Package Offering	2004-2005	\$25,000	MRSWA Operating Budget	
MRSWA	Feasibility Analysis of Commercial Recyclables Collection Package Offering	2004-2005	\$25,000	MRSWA Operating Budget	
MRSWA	Feasibility Analysis of Sludge Composting	2006-2007	\$50,000	MRSWA Operating Budget	
MRSWA	Feasibility Analysis of Offering a Document Destruction/Recycling Service	2006-2007	\$25,000	MRSWA Operating Budget	
MRSWA	Feasibility Analysis of Establishing a Universal Waste Management Service	2007-2008	\$25,000	MRSWA Operating Budget	

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The County also plans to expand the capacity at two of its sites – Plum Creek and Prices Fork – through the addition of another solid waste compactor at each site. These additional compactors cost about \$22,000 to purchase and install. The County plans to make the investment in these additional compactors within the next five years and will pay for these investments with monies from the County's General Fund.

## 6.6.5 Virginia Tech

Virginia Tech has indicated a desire to support the development of a regional composting facility by the MRSWA. Virginia Tech officials hope that the MRSWA will implement such a facility within the next 5 years. (The MRSWA is currently in the process of constructing a yard waste processing facility).

Virginia Tech support of this regional facility will not involve the investment of capital funds but rather the provision of political support and technical expertise.

### **6.6.6** MRSWA

The MRSWA plans to conduct five feasibility studies within the next five years:

- o Feasibility Analysis of Commercial Waste Collection Package Offering
- o Feasibility Analysis of Commercial Recyclables Collection Service Offering
- Feasibility Analysis of Sludge Composting
- Feasibility Analysis of Providing a Document Destruction/Recycling Service
- Feasibility Analysis of Establishing a Universal Waste Management Program.
   These feasibility studies are anticipated to cost \$25,000-\$50,000 each and will be paid for out of MRSWA Operating Fund.

Depending on the outcome of these studies, significant future investments in capital facilities and equipment may be required on the part of the MRSWA, which will fund these investments with operating funds or through the issuance of revenue bonds. The potential outcome of implementing one or more of these services or programs would be a substantial increase in the region's recycling rate.

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## 6.7 Conclusions

Over the last 15 years, the Montgomery Regional Solid Waste Authority has implemented – on behalf of and with the assistance of its member jurisdictions and institutions – one of the premier, integrated, publicly-controlled solid waste management systems in the U.S.

This system has enabled the planning region to achieve a municipal solid waste recycling rate of 27%, which puts the region in compliance with the State-mandated MSW recycling rate of 25%. When recycled materials from other waste streams are considered, a recycling rate of 33% has been documented for the region.

The MRSWA Recyclables Processing Facility produces recycled materials of the highest quality that can be competitively marketed to regional and national recycling markets.

The MRSWA Transfer Station, when coupled with the NRRA Regional Landfill, has the capacity to provide for secure and controlled MSW disposal for the region throughout the 20 year planning period and beyond.

The fact that the NRRA Regional Landfill is publicly-owned and controlled means that its life will not be shortened due to the opportunities for increased revenues created by the disposal service marketplace. In addition, the public board that oversees the landfill has a direct say in the types of wastes disposed of at the landfill and the rate of filling allowed at the landfill. This public control translates into lower MSW disposal risks to the MRSWA and its members.

In addition to the MRSWA facilities, the planning region will continue to rely on the facilities and services of private sector companies for the management of construction and demolition wastes, industrial wastes and regulated medical wastes. The private sector also plays a key role in the management and processing of special wastes such as waste oil, used batteries and discarded tires.

The additional services that will be implemented and/or evaluated as a result of this plan will serve to strengthen and refine the integrated solid waste management system that is already in place.

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With these additional services, and with the continued involvement of the private sector, the planning region should continue to be served by an effective and secure solid waste management system - that complies with State goals and achieves local objectives - over the next twenty years.

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## A.1 INTRODUCTION

The purpose of this section is to present summary information on the solid waste management alternatives evaluated by each of the participating jurisdictions and organizations in the development of this regional plan.

## A.2 TOWN OF BLACKSBURG

#### A.2.1 Introduction

During the preparation of this plan, Town representatives indicated an interest in the evaluation of the following new or expanded services:

- 1. Full Implementation of Apartment Recycling Program
- 2. Automated Collection of Recyclables.

A cursory status report and evaluation of these alternatives is provided below.

## A.2.2 Full Implementation of Apartment Recycling Program

The Town of Blacksburg adopted a mandatory "Apartment Recycling Ordinance" in 1992. However, this ordinance has not been effectively enforced, resulting in low participation and diversion rates.

Apartment recycling programs are commonplace throughout the U.S., with some programs having been started over 20 years ago. Generally, recycling bins or carts are set next to trash dumpsters. Residents are provided with instructions on the identification and preparation of acceptable recyclable materials. In some cases, residents are also provided with small (e.g., 5-gallon) recycling containers to transport their recyclables to the centralized recycling bin or cart. A number of ongoing programs have been established in university communities.<sup>1</sup>

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See Orange County, NC Solid Waste Management Department. "Apartment and Multi-family Recycling." (<a href="http://www.co.orange.nc.us/recycling/apartment.asp">http://www.co.orange.nc.us/recycling/apartment.asp</a>). Also, Michigan State University – Office of Recycling and Waste Management. "How To Recycle In University Apartments" (<a href="http://www.recycle.msu.edu/services/uapts.htm">http://www.recycle.msu.edu/services/uapts.htm</a>)

A number of communities have established ordinances requiring apartment owners to offer recycling services. Ordinances range from simply requiring that a recycling service be offered, to requiring that a minimum amount of collection space (e.g. 30% of the space targeted for waste collection must be allocated for the collection of recyclables.)<sup>1</sup>

As with other programs, apartment recycling programs are not implemented without costs. Reported costs in the literature are on the order of \$1.00/unit/month<sup>2</sup>.

The major issue faced by the Town appears to be one of enforcement. Enforcement actions in other areas range from "working with violators" to the assessment of fines and/or disposal restrictions. In Blacksburg, fines could be assessed to apartment owners who do not comply with the recycling ordinance, with the revenues used to support the apartment recycling program.

Because of the high turnover and anonymity associated with apartment recycling programs, contamination is an ongoing issue that must be addressed. In addition, there is a need for continued education and program support.

## **A.2.3** Automated Collection of Recyclables

Residential waste in the Town of Blacksburg is currently collected with automated refuse collection trucks. These vehicles use a mechanical, hydraulically operated arm to grab, lift and empty the 90-gallon rollout container which the resident uses to set out refuse for collection.

In recent years, there has been a growing movement toward the utilization of automated collection trucks for the collection of recyclables and/or yard waste, as well as refuse.

Advantages of automated collection include reduced collection crew sizes (the automated trucks can be operated by a single driver/collector); increased productivity; increase number of types and quantities of recyclables collected, and reduced worker injuries. Drawbacks include higher

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See County of Sacramento, CA. Municipal Services Agency-Waste Management and Recycling-Collection Services-Apartments. (www.sacgreenteam.com/services/apartments.htm).

<sup>&</sup>lt;sup>2</sup> "Recycling Opportunities in Concord, CA" (http://www.ci.concord.ca.us/living/recycle.htm)

vehicle capital and operating costs, higher recycling contamination rates and the requirement to commingle the recyclables in a single container.

The following considerations apply to the Town of Blacksburg in the consideration of this option:

- MRF Processing Capability For communities to implement automated recyclables collection, the local Materials Recovery Facility (MRF) must be able to process commingled recyclables sometimes referred to "single stream" recyclables. The MRSWA RPF does not have this capability. Therefore the recyclables would have to be collected in two streams one consisting of commingled containers and the other consisting of commingled fibrous materials. There are communities that provide recyclables collection services in this manner, collecting commingled containers and commingled fibrous materials the next.
- Capital Costs It is likely that the costs of automated recyclables collection would be equal to or possibly lower than the costs of the current bin collection service. However, a significant up front investment would be required to provide the automated rollout containers to the residences, which cost on the order of \$60 each

## A.6.3 Town of Christiansburg

#### A.3.1 Introduction

During the preparation of this plan, Town representatives indicated an interest in the evaluation of the following alternatives:

- Increasing the efficiency of solid waste collection services
- Expansion of the Town's Recycling Program

A cursory evaluation of these alternatives is provided below.

## **A.3.2** Increasing the Efficiency of Solid Waste Collection Services

The Town of Christiansburg provides weekly refuse collection services to its residents using manual, rear loading packer truck staffed by 3-person collection crews. The Town's 4,750 residential customers are served by three collection crews, which translates to a productivity rate of 317 households/crew/day. The Town has reported that the costs for all of its residential collection services equate to approximately \$12.50 per household per month.

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There are two issues that could potentially impact the Town with the current collection approach.

- Worker Compensation and Safety The Town employs the manual method of refuse collection where the collector lifts and empties each waste container into the collection truck. Concerns with this approach include worker compensation and safety, especially with respect to the potential for back and other injuries related to heavy lifting. For these reasons, numerous communities across the U.S. have switched to some form of mechanized refuse collection which employ mechanical methods of lifting and emptying the refuse containers.
- Collection Efficiency The Town's productivity rate appears to be on the order of 317 households served per crew per day. While an in-depth analysis is needed to fully evaluate this productivity level, it appears the productivity gains could be achieved through the implementation of semi-automated or automated collection methods. For example, reported average productivity levels for semi-automated collection methods are on the order of 600-800 households per crew per day while automated collection crews commonly serve 1,000 households per crew per day.

The Town may benefit from the implementation of a semi-automated or automated method of refuse collection. In a semi-automated system, rollout carts (typically 90 gallons in size) are distributed to each residence. Cart "flippers" are installed on rear-loading collection trucks (typical retrofit costs are about \$6,000 per flipper per truck) and are used to lift and empty the rollout containers. Crew sizes of 2-3 persons (including the driver) are common. The implementation of a fully-automated collection method would involve the purchase of new collection vehicles that utilize mechanical, hydraulically operated arms to grasp, lift and empty the rollout containers. A significant advantage of this approach is that the vehicle can be operated by a one-person crew.

## A.3.3 Expansion of the Town's Recycling Program

The Town of Christiansburg currently operates three, unstaffed recycling collection centers. The Town has indicated that it is interested in expanding its recycling program.

Most communities that want to increase the effectiveness and impacts of their recycling programs will convert from recycling drop-off centers to the provision of curbside recycling collection services. The increased effectiveness of curbside recycling services, as compared to

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recycling drop-off centers, has been well established and is due to the higher level of convenience provided to the resident wanting to recycle.

Curbside recycling services typically cost on the order of \$2.00 - \$4.00 per household per month. The Town has indicated that it considers this cost prohibitive and therefore does not want to pursue the curbside recycling option.

Proven methods of increasing the utilization of recycling drop-off centers include the following:

- Longer operating hours
- Staffing of centers
- Increase in the number and types of materials collected
- Locating the centers in more convenient locations

Another proven method of increasing diversion through recycling centers is to charge residents for waste collection through the implementation of some type of volume or weight based fee. Residents will then take their recyclables to the drop-off centers to reduce their waste collection costs.

## A.4 Virginia Tech

### A.4.1 Introduction

During the preparation of this plan, the Virginia Tech representative indicated an interest in the evaluation of the following alternatives:

Food waste composting

A cursory evaluation of this alternative is provided below.

### A.4.2 Institutional Food Waste Composting

Composting has been used as a means of processing parts or all of the municipal solid waste stream for over 50 years. In the last 15 years, with the advent of curbside yard waste collection programs and the banning of yard waste from disposal in municipal solid waste landfills, there has been a tremendous growth in the development of yard waste composting

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facilities. The U.S. Environmental Protection Agency reports that there are currently over 3,700 yard waste composting facilities in the U.S.

Even more recently, there has been a growing interest in the development of composting systems for parts, or substreams, of the municipal solid waste stream. One substream that has engendered particular interest with respect to composting is the food waste substream.

Centralized composting facilities generally fall into three major categories: 1) aerated static pile, 2) windrows, and 3) in-vessel systems. The aerated static pile windrow is the major approach used for the composting of yard wastes. However, because of odor concerns, it appears that most communities are relying on in-vessel systems to compost food wastes.

Participating restaurants and other organizations separate food waste and place it in specially designated containers. The food waste is collected by a licensed garbage hauler who transports it to the composting facility.

At the facility, the food waste is mixed with leaves and grass, shredded brush or sawdust. Water is added to bring the moisture content of the mixture to 50%-60%. The mixture is then placed into windrows which are periodically turned. When the composting process is complete, the compost is screened and the final product is then offered for sale to the public.

It is conceivable that a centralized food waste composting system could be developed by the MRSWA in associated with its yard waste mulching operation. The food waste could be brought from Virginia Tech and other major institutions in the region (including Radford University).

## **A.5** Montgomery County

#### A.5.1 Introduction

During the preparation of this plan, Montgomery County representatives indicated an interest in the evaluation of the following alternatives:

• Pilot program for curbside recyclables collection.

A cursory evaluation of this alternative is provided below.

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## A.5.2 Curbside Recyclables Collection in Rural Areas

Curbside recycling has been demonstrated to increase the diversion of recyclables as compared with drop-off recycling programs. The increased participation and diversion rates associated with curbside recycling program, however, are not without costs.

Typically curbside recycling programs in urban/suburban areas cost \$1.50-\$3.00 per household per month. In rural, less-densely populated areas, the costs can be significantly higher.

One option that can potentially garner interest in rural areas is the co-collection of refuse and recyclables in a dual compartment compactor vehicle. The collection of both the recyclables and waste in a single vehicle at the same time can significantly lower the "time between households" for both services, which is the major cost driver for curbside collection programs.

### A.6 MRSWA

### A.6.1 Introduction

During the preparation of this plan, MRSWA representatives indicated an interest in the evaluation of the following alternatives:

- Provision of MSW Hauling Services
- Provision of Commercial Waste Collection Services
- Provision of Document Destruction Services.

A cursory evaluation of these alternatives is provided below.

## **A.6.2** Provision of MSW Hauling Services

The MRSWA currently contracts with a private hauler for the hauling of the waste received at the MRSWA Transfer Station to the NRRA Regional Landfill for disposal. The cost of this service equates to \$8.08 per ton of waste hauled, or \$2.46 per truck mile.

The MRSWA has indicated an interest in providing this service with in-house equipment and crews. By doing so, it could potentially reduce the cost of the service as well as implement methods of making the service more efficient.

The development of an in-house capability to haul waste and recyclables could serve the MRSWA well. For example, the MRSWA could potentially back haul recyclables to the RPF

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from Pulaski County and other jurisdictions. By doing so, the costs associated with MSW transportation could be lowered and the throughput at the RPF could be increased. By having the ability to transport recyclables, the MRSWA could offer a combined transport and processing service for mixed recyclables which could potentially increase the throughput at the RPF.

The MRSWA is in the process of implementing a yard waste mulching operation. The development of an in-house transportation capability would allow the MRSWA to directly haul mulch product to distant bulk markets. The MRSWA could also haul recyclables to market.

## A.6.3 Commercial Waste Collection Services

As indicated in Section 3, it appears that over 17,000 tons of MSW are exiting the MRSWA solid waste system and being disposed of in other systems. Section 4 indicates that over one half of the MSW coming to the MRSWA Transfer Station is not under public control and therefore could also exit the MRSWA system in the future.

The lack of flow control over the waste generated within a service area is wreaking havoc for owners of public sector, integrated solid waste systems such as the MRSWA system.

Typically, the costs of disposing of waste at a "disposal only" system are significantly lower than at an integrated system that incorporates waste reduction and recycling. This cost differential causes private waste haulers to utilize the cheaper disposal-only systems leaving the public integrated system with less tonnage and increasingly higher tip fees to cover costs. This vicious cycle of increased tipping fees and reduced waste tonnages has resulted in the demise of more than one public integrated system.

One of the ways for public sector systems to counter this trend is to "get into" the commercial waste hauling business. By doing so, the public agency can effectively compete with a private disposal company by offering the same services (i.e., collection and disposal).

The development of an in-house capability to provide commercial, front end loader services would enable the MRSWA to offer commercial recyclables collection services throughout the MRSWA service area. The potential benefits would include increased throughput

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at the MRSWA RPF, increased diversion of waste from landfill disposal, and increased revenues to the MRSWA.

# A.6.4 Document Destruction and Proprietary Waste Disposal Services

With in-house collection and transportation capability, the MRSWA could also develop a document destruction service as well as a proprietary waste disposal service. Both services are in increasing demand by commercial and industrial customers and both generate high per ton revenues.

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